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FOREWORD

It is a distinct honor for the Medical College of the State of South Carolina to have this February, 1951, issue of the *AMERICAN SURGEON* devoted to contributions from our teaching staff. Following the precedent set by other southern schools of medicine which have sponsored numbers of this journal previously, we have endeavored to present subjects of practical clinical interest to the general surgeon.

By and large, these papers are from the younger members of our permanent staff. These men, having completed their formal training here and elsewhere, are the nucleus of what we hope will soon become a more effective group in our expanding program of education, investigation and service.

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DUODENOCOLIC FISTULA FROM ADVANCED CARCINOMA OF TRANSVERSE COLON. MASSIVE PALLIATIVE RESECTION*

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Charleston

THE case reported in this paper presents the rather unusual problem of correcting a malignant duodenocolic fistula and also is of interest in relation to current controversy regarding radical surgery for advanced abdominal cancer.

While gastrocolic fistulae both from malignancy and from peptic ulcer, especially after gastroenterostomy, have been well recognized, fistulae between the duodenum and colon have not been the subject of much consideration in the surgical literature. Recently Ogilvie¹ reported 2 cases of nonmalignant duodenocolic fistula, which appeared to have originated from caseous tuberculosis of lymph nodes and which were cured by surgical closure. In discussion of this paper, Krock² reported a case believed to have arisen from a perforating diverticulum of the duodenum.

There has been much discussion concerning the indication and justification for extensive excisional surgery in advanced cancer since the report by Brunschwig³ in 1947. Whipple⁴ has recently made some thoughtful observations in this regard largely on the positive side; while others are concerned lest disability produced by radical surgery may outweigh the possible palliation. In the present case, the unexpected necessity of a radical operation in a desperate situation resulted in a remarkable benefit to the patient, which has persisted at the time of this writing to a period of 22 months.

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CASE REPORT

Mr. M. O., white male, aged 71, Roper Hospital #48,950, was admitted on Jan. 18, 1949, and shortly thereafter transferred to the State Cancer service under the program for terminal care. His history noted that two and a half years before a laparotomy had revealed advanced carcinoma of the transverse colon with direct extension into the retroperitoneal tissues and into the posterior wall of the stomach. A palliative cecostomy was done and this resulted in a fairly comfortable existence for two years and three months. All bowel movements were through the cecostomy and a colostomy bag was used with an average degree of satisfaction.

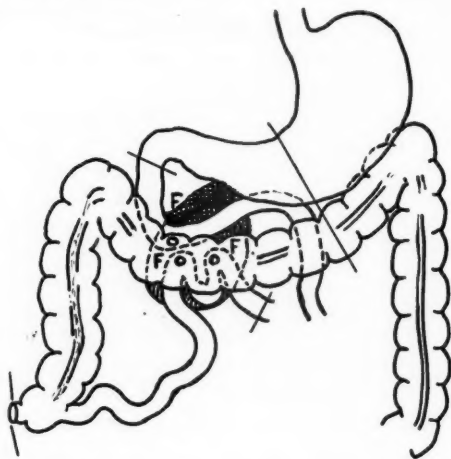


Fig. 1A. Carcinoma of transverse colon with fistulae into duodenum and lower ileum. Schematic drawing of relation of fistulae (F) to tumor. Points of section for massive excision are indicated.

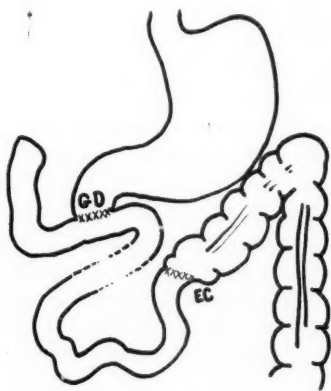


Fig. 1B. Restoration of continuity after excision. G D = end-to-side gastro-duodenostomy. E C ileo-colic end-to-end anastomoses.

Three months before admission, a rapidly downhill course ensued. This was characterized by constant diarrheal discharge through the cecostomy with ultimate erosion and digestion of the skin of the abdominal wall. There was progressive anorexia and inanition. There were beginning decubiti over the sacrum. An important item in the history, that of foul eructations, was obtained from the family only after a duodenocolic fistula was encountered at a later operation. Barium studies of the gastrointestinal tract revealed complete obstruction of the transverse colon by a carcinoma with fistulation into the ileum. A duodenocolic fistula was not recognized. There was a large fixed mass centering just above and to the right of the umbilicus.

Vigorous measures to reduce the diarrhea, heal the erosions and restore the general nutritional status with blood and other intravenous injections resulted in enough improvement that surgical exploration was decided upon in the hope of improving the situation by some sort of short-circuiting or exclusion type of operation. An anastomosis between the ileum proximal to the known ileocolic fistula and the colon distal to the obstructing tumor was contemplated as the maximum procedure likely to be tolerated.

At operation on February 18, 1949, a large tumor mass of the right transverse colon was firmly adherent to the pyloric end of the stomach and to several loops of terminal ileum. There was no evidence of distant metastasis and a certain degree of mobility of the mass over structures posteriorly tempted us to dissect out its relationships. Quite soon it became evident that we had torn widely into the anterior wall of the inferior portion of the duodenum and that a duodenocolic fistula through carcinomatous tissue was present. There seemed no alternative at this juncture to a radical excision. Division was done of the lower ileum about 4 feet from the ileocecal valve, of the transverse colon near the splenic flexure, of the midportion of the stomach, of the duodenum just above the ampulla of Vater and of the cecostomy (fig. 1A). The resected mass included the right colon, 4 feet of ileum, lower portion of stomach, anterior wall of the inferior duodenum, and most of the greater omentum. There was a small amount of residual carcinoma about the superior mesenteric vessels extending into the pancreas which was not removed. There was not enough of the posterior wall of the inferior duodenum remaining for closure; so the end of the stomach was brought down in an end-to-side anastomosis. End-to-end anastomosis of the ileum to the splenic flexure of the colon completed restoration of continuity (fig. 1B). Duration of the operation was 6 hours and 25 minutes. Two thousand, four hundred and fifty c.c. of blood and 900 c.c. of 5 per cent glucose in water were given during operation.

The postoperative course was smooth and he was discharged in three weeks on an unrestricted diet. There were 2 to 3 bowel movements per day by rectum without diarrhea. Gain in weight, strength, and general well-being was progressive and he soon became able to lead a normal life without discomfort of any kind. The total gain in weight from 92 pounds on March 10, 1949, to 125 pounds on December 1, 1949, was 33 pounds. He was readmitted on October 12, 1950, with an attack of acute hepatitis and made a satisfactory recovery. There is no evidence by x-ray or physical examination of any massive recurrence of his carcinoma. Radical surgery has given this patient, previously considered terminal, almost 2 years of happy existence up to the present time. His present age is 74 years.

It is of interest to note that pathologic studies on lymph nodes included in the resected specimen showed no evidence of carcinoma.

DISCUSSION

The method of using the end of the partially resected stomach to reconstruct the anterior wall of the inferior duodenum is probably unique. No mention of such an anastomosis in man was found on a cursory survey of the literature. It is not likely that the anatomical necessities of the present case will often arise. To have added a pancreatico-duodenectomy to the above procedure might have surpassed the tolerance of the patient or of the surgeon. Furthermore, total removal of every cancer cell was impossible because of involvement of the superior mesenteric vessels. This patient's course thus far suggests the possibility that he may outlive his cancer and ultimately succumb to some other cause.

SUMMARY

A case is reported of carcinoma of the transverse colon with fistulae into the duodenum and ileum. A satisfactory course after massive palliative resection continues after 22 months.

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PERFORATED CARCINOMA OF THE STOMACH*

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THE occurrence of 4 cases of perforated gastric carcinoma on the surgical service of the Roper Hospital in the past 12 months stimulated our interest in this subject. The first recorded diagnosis of perforated gastric carcinoma was reported by Laennec in 1824. Since that time, similar reports have been surprisingly infrequent. As Boyce⁴ pointed out, these cases are probably more frequent than the sparse reports indicate. Boyce noted that 2 per cent of the gastric malignancies in Charity Hospital perforated. Casberg⁶ recorded perforation in 7 of 247 carcinomas of the stomach. McNealy and Hedin¹³ reported 133 cases of perforation of gastric malignancy which constituted 4.04 per cent of all gastric carcinomas seen in a 12 year period.

From the reports in the literature, the outlook for patients suffering this catastrophe has been dismal. Many cases have been reported as pathologic oddities found at autopsy. Aird¹ stressed the fact that, while two-thirds of the cases he collected gave acute fulminating symptoms typical of a perforated viscus, the remaining third were classified as "obscure" and had surprisingly little in the way of abdominal symptoms and signs.

Less than one half of the reported cases have been subjected to operation. Bisgard and Overmiller³ in 1944 collected 115 cases of perforated gastric malignancy which had been operated on up to that time. Of these 115 patients, 78 died in the hospital, a mortality rate of 67.8 per cent. Fifteen of these cases were treated by primary resection, the form of therapy advocated by Bisgard and Overmiller³ and 13 of the 15 survived to be discharged from the hospital as improved. Forty-nine cases were treated by closure of the perforation and 38 of these died in the hospital. Six patients had primary simple closure of the perforation with subsequent gastric resection and 3 of these survived. Other procedures recorded with a notable absence of success were simple drainage, closure combined with gastroenterostomy or jejunostomy, and jejunostomy alone.

The report by Bancroft and Vermilye² of a single case treated by primary gastric resection, with death ensuing on the twentieth post-operative day after breakdown of the duodenal stump, was not included in the above collection. Since Bisgard and Overmiller's pub-

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lication, several other reports have appeared. Boyce⁴ reported 36 cases, of which only 16 had surgery performed. Three of these cases involved exploration only, 3 closure of the perforation, 3 gastroenterostomy, 3 primary gastric resection, 2 jejunostomy, 1 gastrostomy and 1 simple drainage. Of these 16, only 6 survived to leave the hospital and 2 of these were patients who had primary gastric resection. Jarboe and Pratt¹⁰ recorded a single case who survived primary gastric resection in the presence of a subdiaphragmatic abscess. Modlin¹⁴ reported 1 case surviving primary gastric resection for perforated malignancy. Luer¹¹ added 5 cases of perforation, all treated by simple closure, with 80 per cent hospital mortality.

Thus, to date, 21 primary resections for perforation of gastric malignancy have been recorded with only 4 hospital deaths, a mortality rate of 19.0 per cent.

Aird,¹ as well as numerous of other authors, indicated the technical difficulties of safely closing a perforation through friable malignant tissue by suture, and these difficulties have been reflected in the high mortality rate of simple closure. When closure of the perforation was effected by a simple omental patch, survival was more frequent. Many cases, however, were obviously not subjected to a procedure of greater magnitude than closure because of metastases and contiguous invasion. Others were not suitable for resection because of extremely poor general condition.

The comparatively good results following primary resection may be more apparent than real, since series of failures are seldom reported. Boyce⁴ adopted an extremely pessimistic viewpoint concerning this condition, but he and all other recent authors have indicated that primary gastric resection at the time of perforation is the treatment of choice. Jarboe and Pratt¹⁰ have emphasized the importance of sulfonamides and antibiotics in increasing the safety of resection in the presence of peritoneal contamination.

From January, 1940, to the present time, approximately 144 patients have been seen here because of carcinoma of the stomach and during the same period, 7 perforated gastric malignancies have been encountered, a rate of 4.9 per cent. The diagnosis was confirmed in 3 of these at operation, in 3 at autopsy, and in 1 at both. An additional case in the experience of one of us (RWP) is included because of the particularly interesting sequence of events in his illness.

CASE REPORTS

CASE 1. A 50 year old white man was admitted September 30, 1946, because of hematemesis in small amount and tarry stools for two days. Three

months before admission he had gnawing epigastric pain midway between meals and he was given an ulcer regime with moderate improvement. On physical examination the blood pressure was 72/58. He appeared thin but not acutely ill. The abdomen was soft and no masses or organs were palpable. The hemoglobin was 5 Gm. with 2,750,000 red cells, and the white cell count was 17,000 with 86 per cent polymorphonuclear forms. The patient was given whole blood transfusions and had no further bleeding. He was discharged from the hospital on an ulcer regime 28 days after admission.

He returned seven days later because he had vomited a rather large quantity of blood and again was treated by transfusions. After all signs of bleeding had disappeared, a gastrointestinal series was done and showed a large, fungating, filling defect involving practically the entire stomach. At operation, a large, nodular, indurated mass was found occupying about three quarters of the stomach. A perforation of the stomach with abscess formation between the stomach and anterior abdominal wall had occurred. The perforation was closed and nothing further done. He was moderately febrile after operation but otherwise did fairly well and was discharged, only to be readmitted two months later.

During his time at home he had been able to eat fairly well, had very little pain and no further bleeding. On the night of admission, he ate an unusually large meal which was followed by severe abdominal pain. On examination, he was emaciated and showed marked tenderness in the epigastrium, with rigidity throughout the entire abdomen, more marked in the upper portion. Only symptomatic treatment was felt to be indicated. During the next 48 hours, the pain and tenderness improved with penicillin therapy and parenteral alimentation. His course after this, however, was rather rapidly downhill and he expired on the seventeenth hospital day. Autopsy showed replacement of almost the entire stomach wall by neoplastic tissue. A perforation of the anterior wall of the stomach was noted with left subdiaphragmatic abscess, and without generalized peritonitis. Metastases to the pancreas and liver were evident.

CASE 2. A 56 year old white man was admitted September 5, 1946, because of vague epigastric pain of four months duration. About five weeks before admission, after drinking ice water, he had severe abdominal cramps, followed by vomiting. The epigastric pain then became more severe and remained almost constant with loss of appetite but no further vomiting. This symptomatology persisted, accompanied by a loss of 25 pounds. On physical examination he was fairly well developed and nourished. Tenderness was present throughout the entire upper portion of the abdomen with increased muscle tone. An extremely tender mass was palpable in the upper portion of the epigastrium, extending toward the left. The white cell count was 13,000 with 80 per cent polymorphonuclear forms; hemoglobin was 11 Gm. Upper gastrointestinal series showed a large filling defect along the greater curvature of the stomach.

At operation, a tremendous ulcerative process was found involving the major portion of the stomach, principally along the lesser curvature and the posterior wall. The lesion was adherent to the inferior surface of the right lobe of the liver and, on dissection, a perforation was found with a localized abscess in the lesser omental bursa. Metastases to the regional nodes were present and operation therefore was limited to biopsy and drainage of the abscess. Pathologic study showed highly anaplastic carcinoma of the stomach. In spite of considerable drainage postoperatively, his course was reasonably

satisfactory and he was discharged from the hospital 16 days after operation, somewhat improved. All efforts to trace the subsequent course of this patient have failed.

CASE 3. A 26 year old colored girl was admitted to the hospital on August 6, 1940, because of post-prandial epigastric pain of three months duration, with resultant diminution in dietary intake. A gradually enlarging mass in the epigastrium had been noted for three months. On several occasions she had vomited coffee ground material and her stools had been tarry. There had been a weight loss of 10 pounds. Physical examination showed temperature of 100.8° F., pulse 104, respirations 24 and blood pressure 104/46. The patient was extremely thin and pale. Abdominal examination showed a firm, tender mass about 5 cm. in diameter midway between the umbilicus and xiphoid. The mass was irregular and only slightly movable. The red blood cell count was 880,000 and the hemoglobin, as well as could be estimated, was 1 Gm. The white cell count was 22,000, with 82 per cent polymorphonuclear forms. X-ray showed a large, filling defect, extending from just below the cardia almost to the pylorus. The patient received transfusions and, as soon as she felt stronger, returned home against advice.

She returned to the hospital September 17 with essentially the same complaint and findings, including severe anemia. Again she received transfusions and left against advice after being in the hospital only three days.

A week later she was readmitted to the hospital in extremis. Her course at home had been rapidly downhill, with increasing pain and weakness. The abdomen was distended and the mass was about twice its previous size. She expired 30 minutes after arrival. Autopsy showed generalized peritonitis. A carcinoma in the lower portion of the stomach was found to have an oval perforation about 0.5 cm. in diameter in the center. Metastases to the liver and regional lymph nodes were present and there was invasion of the pancreas and of the transverse colon by direct extension. Microscopically, the carcinoma was found to be highly anaplastic.

Comment: These 3 cases represent the obscure type of "silent perforation" emphasized by Aird,¹ with insidious progression of symptoms following perforation, and ultimate death. All 3 of these cases, however, had had previous gastrointestinal symptoms and had been diagnosed by x-ray as having carcinoma of the stomach. Two of them had had gastrointestinal bleeding.

CASE 4. A 64 year old colored man was admitted on April 11, 1950, because of epigastric fullness and discomfort made worse by food of three months duration. Three weeks prior to admission the pain increased in severity, became constant, and nausea and vomiting developed. On one occasion he vomited about a cupful of dark blood. The stools had been tarry for about three weeks. A weight loss of 10 pounds had occurred. The physical examination showed a fairly well nourished, elderly man. There was marked epigastric tenderness and increased muscle tone, but no abdominal masses were present. The hemoglobin was 8 Gm., with 2,900,000 red blood cells and the white cell count was normal. Gastrointestinal series showed a large filling defect involving the entire circumference of the stomach from just below the cardia to the incisura angularis.

Operation was carried out on April 25. A carcinoma involving the major

portion of the stomach was found, with metastases to the regional lymph nodes and implants on the peritoneum. The stomach was adherent to the inferior surface of the left lobe of the liver where a 1.5 cm. perforation of the stomach opened into an abscess cavity containing foul smelling pus. The perforation was closed with an omental patch and a lymph node removed. Histologic study was reported as showing adenocarcinoma. His postoperative course was entirely uneventful and he was discharged from the hospital 10 days after operation. His course was progressively downhill. He was readmitted to the hospital for terminal care but decided to return home where he expired on August 17, 1950.

Comment: In this case a diagnosis of carcinoma of the stomach had been made on the basis of x-ray findings and perforation was suspected, on the basis of abdominal signs, prior to operation. Unfortunately the lesion was so extensive that resection was impossible. The recovery from operation may indicate the value of the omental patch as a means of closure in these cases.

CASE 5. A 40 year old colored male was admitted November 23, 1949, with a history of slight epigastric pain, anorexia, nausea and vomiting of three weeks duration. Two weeks before admission, the pain suddenly became extremely severe and persistent. As he lived alone, he ate very little, had no treatment and was extremely ill when a relative found him and brought him to the hospital. Physical examination showed an acutely ill, dehydrated man. The temperature was 100.6° F., pulse 124, respirations 46 and blood pressure 140/100. The abdomen appeared slightly distended and tympanitic. Generalized abdominal tenderness, more severe in the right lower quadrant, was present with rebound tenderness and increased muscle tone. A moderately tender, boggy mass on the right side was felt on rectal examination. The hemoglobin was 13.5 Gm. and the red cell count 3,950,000. The white cell count was 22,500 with 97 per cent polymorphonuclear forms. Urea nitrogen was 72 mg. per cent and blood chlorides 370 mg. per cent. Plain x-ray of the abdomen showed no bowel distension.

Because of the duration of his illness and his extremely poor general condition, it was elected to treat him without operation. His condition continued to deteriorate, however, and, on December 10, under local anesthesia, a large abscess in the right upper quadrant immediately beneath the abdominal wall was drained, removing about 250 c.c. of thin, yellowish, foul-smelling material. After temporary improvement, rapid regression occurred and he expired on December 15.

At autopsy, generalized peritonitis was found, with a large, left subdiaphragmatic abscess and another abscess in the pelvis. Multiple small abscesses were noted throughout the abdominal cavity. On the posterolateral surface of the cardiac end of the stomach was a massive carcinoma with a large perforation in the center. The perforated area was walled off by the surrounding viscera and only a small abscess cavity remained in this region. The carcinoma was scirrhous in type with metastases to the lymph nodes in the vicinity but none elsewhere.

Comment: This case is probably an example of the acute fulminant variety of perforation. Owing partly to the lack of intelligence of the patient, no treatment was sought until two weeks after

the apparent occurrence of perforation. Contemplated diagnoses on admission were perforated peptic ulcer, perforated carcinoma of the stomach and perforated appendix. The massive peritonitis and the poor general condition of the patient precluded immediate operative intervention, and therapeutic efforts were directed toward localization of the peritoneal infection.

CASE 6. A 35 year old white male was admitted March 27, 1949, because of stomach trouble. In 1943 he had developed typical ulcer symptoms. A duodenal ulcer was diagnosed by x-ray examination, but healed with medical treatment. Between 1945 and 1949, he had several recurrences of ulcer pain, each time responding promptly to medical therapy. In January of 1949 no ulcer could be demonstrated by x-ray (at another hospital) during a recurrence of pain. Three days prior to admission, the epigastric pain recurred, but this time it was much more severe and persistent and was accompanied by vomiting. He appeared acutely ill, but the general examination was not remarkable. Marked epigastric tenderness with increased muscle tone was present and very slight but definite rebound tenderness. The white cell count was 14,100 with 78 per cent polymorphonuclear forms, and no anemia was found.

A diagnosis of penetrating ulcer was made and the patient given medical therapy followed by gradual improvement. As tenderness and spasm decreased, the liver was felt 3 fingerbreadths below the costal margin and a rounded mass became palpable in the epigastrium. On the fifth hospital day extremely severe generalized abdominal pain suddenly developed, followed by peripheral vascular collapse. Marked tenderness, rebound tenderness and rigidity were noted throughout the abdomen. Operation was performed immediately. In the midportion of the lesser curvature of the stomach was a large perforation in a firm and nodular ulcer. Several metastatic nodules were present in the liver. The perforation was closed using an omental patch. After operation, there was gradual improvement over a period of about a month, following which his course was progressively downhill with death on July 4, 1949.

Autopsy showed an extensive ulcerating carcinoma of the lesser curvature of the stomach, with massive hepatic metastases and implants in the omentum.

Comment: The perforation in this patient was recognized immediately but the extent of carcinomatous involvement precluded resection. It was technically impossible to close the perforation by suture, but recovery from the acute episode followed use of an omental patch. This case is also interesting in that the patient had been repeatedly diagnosed roentgenologically by competent observers as having a duodenal ulcer which had responded repeatedly and typically to a proper medical regimen. The occurrence of duodenal ulcer concomitant with gastric carcinoma is very rare. The case of Bisgard and Overmiller³ was similar.

CASE 7. A 38 year old colored male was admitted on May 9, 1950, because of abdominal pain of eight hours duration. For three to four months he had noted occasional slight epigastric distress. Having consumed a considerable quantity of whiskey the evening before, he was awakened about 6 a.m. by a severe, sharp epigastric pain, followed by nausea and vomiting. The pain per-

sisted and radiated into the right lower quadrant. Physical examination showed an acutely ill man with temperature of 96° F., pulse 108 and respirations 20. Except for marked oral sepsis, the positive physical findings were limited to the abdomen, where there was tenderness throughout, more marked in the epigastrium and in the right lower quadrant, increased muscle tone, rebound tenderness and absence of peristalsis. The rectal examination showed slight tenderness high on both sides. The white blood count was 9,050, with 90 per cent polymorphonuclear leukocytes. Upright film of the abdomen showed free gas under the right leaf of the diaphragm. At operation, a round perforation about 1 cm. in diameter was found on the lesser curvature of the stomach just proximal to the pylorus. A full-thickness biopsy was taken and the defect closed with a patch excised from the falciform ligament. His postoperative course was essentially uneventful. The biopsy of the stomach was reported as carcinoma.

On May 25, operation was again carried out. Since no metastases could be demonstrated, subtotal gastrectomy was performed with antecolic gastrojejunostomy. The excised specimen showed adenocarcinoma with metastasis to one lymph node along the greater curvature. His postoperative course again was not particularly remarkable and he was discharged from the hospital on June 10.

The patient has since been followed and, at the time of his last visit on November 2, 1950, he had no evidence of recurrence. His appetite and digestion were good and he had returned to full-time employment.

Comment: At operation, so much contamination was present in the peritoneal cavity of this patient that resection was not deemed advisable. The lesion grossly appeared to be a small benign ulcer, but biopsy was performed as a matter of routine. At the second operation, the absence of adhesions was remarkable and the lesion still had the gross appearance of a small benign ulcer.

Fleming⁸ reported a case of perforated carcinoma with closure, followed in 18 days by partial gastrectomy and uneventful recovery. Other articles,^{9,12} however, have indicated a much longer time interval between closure and subsequent resection. The reports in the literature suggest that growth of a tumor is accelerated following perforation, and therefore the importance of early elective resection becomes obvious. Peritoneal dissemination, of course cannot be prevented.

Brunschwig and Heinz⁵ quote Delaginiere as reporting a case of perforated gastric malignancy treated first by closure with subsequent subtotal gastric resection, with freedom from recurrence 10 years after operation. The survival of case 7 for six months is hopeful but excessive optimism is not justified.

CASE 8. A 64 year old colored man was being followed because of gynecomastia. On a return visit on November 9, 1950, the patient complained of epigastric pain and vomiting of four weeks duration. The pain came on once or twice a day, followed by emesis. His appetite was good and food intake had no relation to the pain. He had lost about 22 pounds during this period.

The patient was well developed and somewhat dehydrated. Abdominal examination showed epigastric tenderness, a little more marked on the right, with moderately increased muscle tone, but no rebound tenderness. The hemoglobin was 11 Gm., with 4,300,000 red blood cells, and white blood count was 11,200, with 74 per cent polymorphonuclear forms. Gastrointestinal series showed evidence of a malignant lesion in the prepyloric area.

The patient was undergoing the usual preoperative preparation when he suddenly developed extremely severe epigastric pain, nausea and vomiting. Examination showed marked abdominal tenderness with rebound tenderness and rigid musculature. Upright film of the abdomen showed free air beneath the diaphragm. At operation, a small perforation was found in a rather small lesion on the anterior wall of the stomach just proximal to the pylorus. As there was very little peritoneal soiling and no obvious metastases, subtotal gastrectomy was carried out. Pathologic study showed adenocarcinoma of the stomach with a single focus of carcinoma in one lymph node. His postoperative course was not remarkable and he was discharged improved.

Comment: It was fortuitous that the perforation in this case occurred in the hospital while the patient was being prepared for gastric surgery. The deficits resulting from partial pyloric obstruction had been largely corrected and the content of the stomach had been aspirated several hours before occurrence of the perforation. The absence of marked contamination at the time of surgery is thus easily explained and probably accounts for the favorable outcome.

DISCUSSION

Five of the 8 cases reported had been diagnosed by x-ray as having carcinoma of the stomach prior to the occurrence of the perforation. Likewise, in 5 of the 8 cases, the clinical diagnosis of perforation offered little difficulty. It must be noted, however, that in only 2 patients (Case 4 and Case 8) could a preoperative diagnosis of perforated carcinoma of the stomach be made. Dickinson⁷ has indicated that the correct diagnosis preoperatively is extremely rare, and is often missed at operation. One should thus have a high index of suspicion toward all perforated gastric lesions and, if primary resection is not feasible, biopsy of such lesions is mandatory. It may be of interest to note that the great majority of these perforations are located on the anterior wall of the prepyloric area close to the lesser curvature.

The percentage of gastric carcinomas complicated by perforation is small, but an aggressive attitude in the treatment of such cases undoubtedly will result in the temporary salvage of heretofore hopeless patients. To date, gastric resection at the time of perforation has unquestionably given the best immediate results. In the presence of massive contamination, closure by omental patch with subsequent resection at an early date would seem to be indicated. Whether permanent cures may result in any of these cases remains to be seen.

SUMMARY

Recent literature concerning perforated carcinoma of the stomach has been reviewed. Eight cases of perforation complicating gastric malignancy have been reported briefly. One case survived primary gastric resection at the time of perforation and another case survived immediate closure of the perforation and subsequent definitive gastric resection.

CONCLUSIONS

1. The preferable form of treatment for perforated carcinoma of the stomach is primary gastric resection.
2. Biopsy of all perforated gastric ulcers is mandatory.

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Addendum: Since this paper was submitted for publication, an additional case of perforated gastric malignancy has been treated. Because of the presence of a large abdominal aortic aneurysm, conservative therapy was instituted, with improvement, and followed later by gastroenterostomy. The patient was discharged improved.

BENIGN STRICTURE OF THE ESOPHAGUS WITH ESOPHAGOBRONCHIAL FISTULA TREATED BY EXCLUSION PROCEDURE

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ATTEMPTS to reconstruct a suitable substitute for the esophagus date back more than 50 years and include a wide variety of ingenious methods. Saint¹ summarized the history of surgery of the esophagus and described the various procedures which had been investigated in both animals and patients. Both antethoracic and intrathoracic routes have been utilized for re-establishment of digestive tract continuity required by the presence of congenital atresia or acquired stricture, and after resection of malignant tumors of the esophagus. Tubes of skin, tubes formed from the stomach wall, the entire stomach, small and large intestine have all been employed. Yudin in Russia is said to have done between 200 and 300 antethoracic reconstructions using the jejunum most frequently.² Except for his series, the majority of reconstructions have been intrathoracic, bringing up either the stomach or a loop of jejunum to re-establish continuity. The largest reported series in this country have been those of Sweet³ and Garlock⁴ who perform intrathoracic anastomosis after resection of the esophagus for carcinoma.

The problem of stricture of the esophagus following chemical burn is a very difficult one. Lye strictures are frequently seen in the South and unfortunately many patients are not brought in until late, when extensive cicatrization has taken place. Only after months or years of dilatations of the esophagus may permanent relief be attained. In some patients an adequate lumen cannot be re-established and gastrostomy feeding is necessary permanently to maintain life. Even if successful dilatation is obtained, during the prolonged course of treatment a number of complications may develop. One of the most important complications is traumatic perforation.

Sweet⁵ in 1946 reported 3 cases of esophageal resection with intrathoracic esophagogastrostomy for benign stricture of the esophagus. He emphasized the extensive periesophagitis following a chemical burn, stating, "The damaged segment is always densely adherent, making it difficult or impossible to find good planes of cleavage for the purpose of dissection." Harrison⁶ in 1949 de-

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scribed two children who had extensive scarring after drinking lye, so that obliteration of the esophagus was practically complete. In both, the scarred esophagus was removed and, in stages, continuity re-established by a loop of jejunum placed intrathoracically and connecting the oral end of the esophagus to the stomach. Both children were doing well at the time of writing.

One of the complications which may develop during dilatation of esophageal stricture is formation of a fistula between the esophagus and the trachea or one of the bronchi. Coleman and Bunch⁷ reviewed the literature on acquired nonmalignant esophagotracheobronchial fistula and found 71 cases, to which they added 4 of their own. In 59 of the 75 cases in which the etiology was stated, trauma was the cause in 21. These were due to compression injury of the thorax, foreign bodies, or instrumentation of esophageal strictures. In their 4 cases, closure was successfully carried out. In the following case, a severe stricture of the esophagus was complicated by an esophagobronchial fistula. Neither resection nor closure appeared advisable.

CASE REPORT

T. B., an 18 months old colored infant, was first admitted February 28, 1949. One month earlier he had swallowed lye in liquid form following which he had been hospitalized in his home town. Dysphagia was progressively more severe and, when admitted here, he could only swallow liquids in small

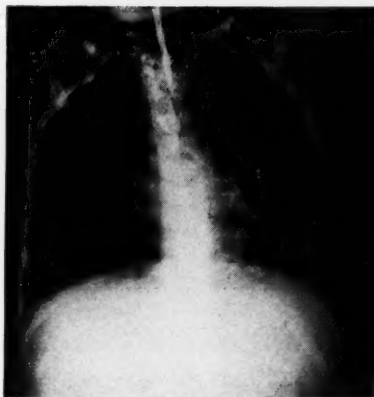


Fig. 1a



Fig. 1b

Fig. 1a. 1b. Anteroposterior and oblique views of chest following swallow of lipiodol preoperatively. Stricture of esophagus with fistula opening into left main bronchus is well outlined by the oil.

amounts. Physical examination was not remarkable except for evidence of weight loss and dehydration. Gastrostomy was done, a string passed and retrograde dilatation carried out at weekly intervals as an outpatient.

He was next admitted June 15, 1949, because of meningitis due to non-hemolytic streptococcus, and responded promptly to antibiotics.

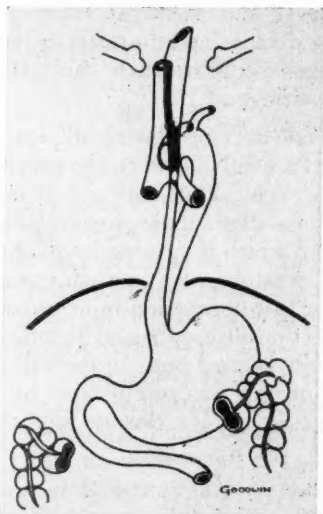


Fig. 2a. Diagrammatic representation of lesion before operation.



Fig. 2b. After first stage, with loop of ileum placed beneath left hemidiaphragm.



Fig. 2c. After second stage, ileum brought up into thorax and anastomosed to esophagus, with exclusion of stricture and fistula.

The weekly dilatations were then continued but very little progress was made. He could take only small amounts of liquids by mouth. For about a

month prior to his next admission, he developed a rather severe cough and lost weight. He was readmitted on Oct. 25, 1949, and examination showed moist rales throughout both lungs. An opening from the esophagus into the left main bronchus was demonstrated by x-ray examination. The patient would not expectorate sputum but would swallow it, following which the sputum again entered the bronchus, was coughed up and swallowed. This vicious cycle continued and aspiration repeatedly gave very little improvement. The pediatric consultant felt that the patient was an extremely poor surgical risk so that every effort was made to improve his nutritional status and to decrease the amount of pulmonary infection. Very little progress was made, however, as the gastrostomy feedings were frequently coughed up and on Dec. 20, 1949, thoracotomy was performed to attempt esophagogastrostomy above the fistula and stricture. When the pleura was opened, the left lung collapsed and, although oxygen under positive pressure was administered and repeated tracheal aspiration performed, adequate oxygenation and a clear airway could not be attained. The procedure was therefore abandoned and the chest closed.

The next approach was an attempt to close completely the esophagus above and below the fistula by cauterization at the time of esophagoscopy, as the opening could not be cauterized through the bronchoscope. The gastrostomy opening was too small to admit the instrument, so the gastrostomy was revised on Feb. 7, 1950. Apparently an opening was made in the gastrostomy tube at the time of the revision as after the first feeding the patient developed signs of marked peritoneal irritation. After his recovery, a Stamm gastrostomy was done on Feb. 18, 1950.



Fig. 3a



Fig. 3b

Fig. 3a, 3b. Anteroposterior and lateral views of chest postoperatively after swallowing barium.

During the next few weeks, his nutrition improved moderately with a slight weight gain. On March 21, 1950, laparotomy was performed. After a tedious dissection necessitated by the dense adhesions, a loop of jejunum, beginning about 20 cm. distal to the ligament of Treitz, was separated from its blood supply by ligation of two primary divisions from the superior mesenteric vessels. The short proximal segment of the divided jejunum was anastomosed

end-to-side (Roux-Y) into the small bowel further down. The long distal segment of the jejunal loop was closed and brought through the transverse mesocolon, the gastrocolic ligament and anterior to the stomach to be placed beneath the left hemidiaphragm. On April 4, 1950, the second stage was carried out through a left thoracotomy incision. The esophagus was dissected out above the arch of the aorta, divided just above the stricture and the aboral end closed. The diaphragm was opened, the jejunal loop freed without difficulty and brought into the chest. End-to-end anastomosis was performed between the oral end of the divided esophagus and the jejunum. Although the mesentery containing the arcade of vessels was slightly tense, an excess length of bowel was available.

For the first three days after operation, the patient's condition was critical due to atelectasis and difficulty in keeping the tracheobronchial tree dry. After this, however, he improved rapidly, the lungs gradually cleared and he took liquids and some soft foods by mouth. Because of limited funds, he was discharged and followed in the clinic at weekly intervals. As he took no solid food and then took soft food poorly, barium x-ray examination was done and showed stricture at the site of anastomosis. Mercury bougie dilatations were started and at the present time he takes food without difficulty, although further dilatation will be necessary.

DISCUSSION

At the time of discovery of the esophagobronchial fistula, this patient presented a difficult problem. The stricture had responded poorly to retrograde dilatations and now the patient had the added complication of the fistula with the consequent pulmonary infection. The simplest approach would have been closure of the fistula as performed by Coleman and Bunch. This did not appear to be feasible because of the following reasons: (1) The general condition of the patient made his survival of a major surgical procedure doubtful. (2) The anticipated periesophagitis along the area of stricture and the acute inflammatory process at the site of the fistula promised an exceedingly long and difficult dissection. (3) The delicate friable tissues which had to be used for suture made a successful closure doubtful. (4) Even should closure be successful and the patient survive, the stricture of the esophagus would still be present and require further dilatation.

Resection of the esophagus and closure of the opening into the bronchus was considered, but the first two objections noted above were equally applicable. In addition, following resection, continuity would have to be re-established either by construction of an antethoracic esophagus or intrathoracic esophagogastrostomy. The difficulties and repeated operations needed to construct the former are well known. It was practically a certainty that the patient would not be able to survive resection and the additional procedure of bringing up the stomach and performing an anastomosis. The stomach could have been employed to exclude the area of stricture

and fistula, but the intra-abdominal adhesions and the two gastrotomy wounds would have made this a formidable procedure in one stage. In addition, preservation of the gastrotomy for feeding was an advantage.

The final decision, therefore, was to exclude the area of fistula by a two-stage intrathoracic esophagojejunostomy. The procedure suggested by Harrison, wherein the distal jejunal end was anastomosed into the stomach, was not done as this would add one more anastomosis to the operation. Further, the possibility of regurgitation of gastric juice into the jejunal loop with ulceration appeared to be a possibility.

The development of stricture at the anastomosis has been very unfortunate but, as the patient can now swallow all but coarse foods and has continued to gain weight, revision of the anastomosis should probably be postponed until he has attained maximum improvement.

SUMMARY

A case of lye stricture of the esophagus with esophagobronchial fistula is reported. The fistula and area of stricture were excluded by a staged intrathoracic esophagojejunostomy.

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DETERMINATION OF TENSILE STRENGTH OF WOUNDS IN VIVO*

Preliminary Report

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THE purpose of this paper is to propose a new approach in the study of wound healing. Undoubtedly, improvement in the mechanics of the proposed method can be anticipated. No final results are being presented, although Williams and Bradshaw¹ have recently reported basic curves of increase in tensile strength using a similar technic. It is hoped, however, by this brief preliminary report to stimulate interest in this approach.

According to Sandblom,² Paget in 1853 and Chlumsky in 1899 recorded the first measurements of tensile strength in wounds. In 1929 Howes, Sooy and Harvey³ published their tensile strength studies of healing wounds which set the pattern for numerous subsequent investigations. During the past two decades, much has been learned about local and general factors which affect wound healing. The basic physiologic processes, however, remain to be described.

A diversity of materials and methods in studying wound healing is obvious upon even a superficial survey of the published reports. The animals used, methods and locations of wounding, types of sutures, intervals of testing, instruments for measuring tensile strength, and even the units of disrupting force vary markedly. Since minor variations may grossly modify results, uniform standardized methods applicable in all laboratories would enhance comparison of separate investigations. The reported procedures usually employ excision of a strip of the wound for testing or the introduction of air or water into a hollow viscus or the abdomen until disruption occurs. The wound is thereby destroyed or the animal killed. The interval from death or from excision of the test strip to testing introduces another variable. Therefore, a uniform method of determining the tensile strength of a wound without death of the animal and with preservation of the wound for resuturing should be of value.

The principles of the present method are (1) secure attachment of the sides of the wound to the instrument, (2) application of the disrupting force in a gradual increment, and (3) accurate measure-

*This work was done while the senior author was a member of the Department of Surgery, Bowman Gray School of Medicine, Winston-Salem, N. C.

ment of the disrupting force. The instrument was designed to test wounds in the abdominal wall of rats, but is adaptable to larger animals, to wounds in other sites or to suture material. Air pressure is exerted in a cylinder against two air-tight disks which are attached to two shafts. At the opposite end of each shaft a second disk is attached to decrease the tendency to buckle. At a selected point on the shaft a metal arm is attached which in turn is secured to the wound. The air pressure thus applied moves the disks apart, this lateral movement being applied to the sides of the wound through the shafts, as shown (fig. 1). The pressure is measured by a mercury manometer, and is controlled by a manually operated cutoff.

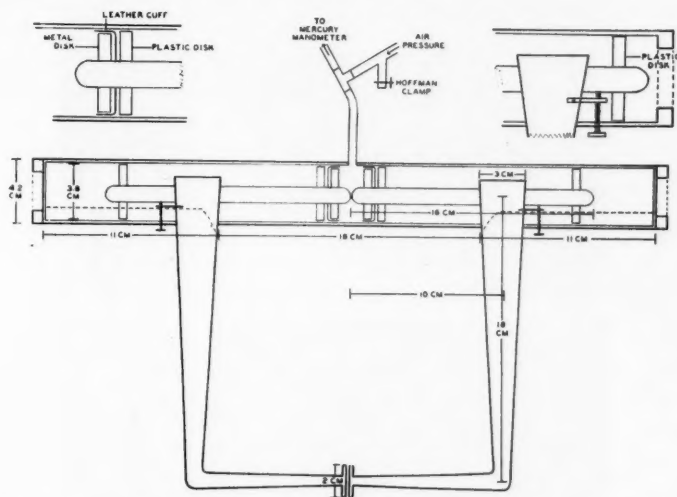


Fig. 1. Cross-section of instrument for testing tensile strength of wounds. Upper left shows detail of air-tight disk. Upper right shows detail of mounting adjustable arm to moving shaft and plastic disk to prevent buckling.

As will be noted (fig. 2) the instrument is mounted to allow rotation of the arms out of the way while the animal is prepared. The slots in the cylinder for lateral movement of the arms also permit slight rotation for minor adjustments. The arms may be set at any desired point on the shafts, depending on the estimated lateral movement necessary for disruption.

In the preliminary studies, male albino rats 6 to 8 months of age and weighing 263 to 373 Gm. were used. Under ether anesthesia, the abdomen was shaved, cleansed with ether and painted with two layers of tincture of merthiolate. By actual measurement, the

wounds were made 0.5 cm. to the left of the midline, beginning 1 cm. below the costal margin and extending 4 cm. in length. A knife was used through all layers and only pressure employed to control the slight bleeding. The viscera were not disturbed. Five fine silk mattress sutures were placed equidistant, passing through all layers and then back through the edge of the skin. The sutures were tied only tightly enough to appose the cut edges. A small piece of sterile gauze was placed over the wound, and a strip of adhesive tape over the gauze, around the abdomen and back.

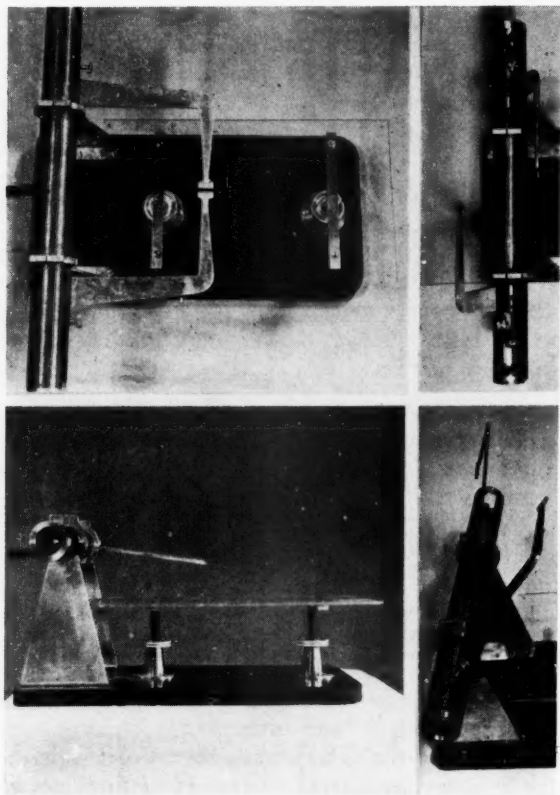


Fig. 2. Photographs of instrument for testing tensile strength of wounds in vivo.
Height of platform for animal is adjustable.

The animals were divided into 4, 8 and 12 day groups and the wounds disrupted at these intervals. At the time of testing, ether anesthesia was again used after the dressing was removed. The wound and abdomen were painted with tincture of merthiolate. The

sutures were very carefully removed. The problem of secure attachment of each side of the wound to the instrument was difficult as it was necessary to avoid disturbance to the wound itself. Two wire sutures placed through all layers of the abdominal wall at a uniform distance from each side of the wound and including a uniform segment of abdominal wall, seemed best suited for this. It was then necessary to protect the abdominal contents when the wire sutures were passed. A small stab wound was therefore made in the left lower quadrant. Through this, a small instrument, usually a knife handle, was gently inserted and carefully manipulated to separate any adherent loops of bowel which might be present beneath the original wound. With the knife handle still in the abdomen, the two wire sutures were placed without danger of catching a loop of bowel. After practice, this could be done with little trauma and without disturbing the wound. Each wire suture was then twisted around the ipsilateral arm of the testing instrument. The latter was then raised slightly and the wound disrupted with measurement of the tensile strength. The wounds were then resutured for further study.

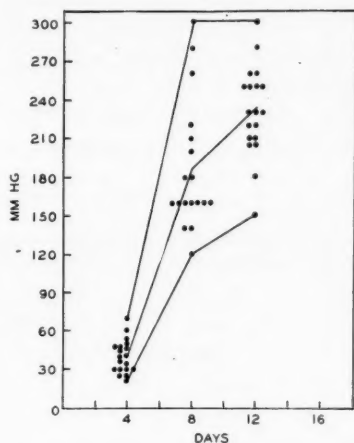


Fig. 3. Scattergram of tensile strength of wounds in 56 rats in this series.

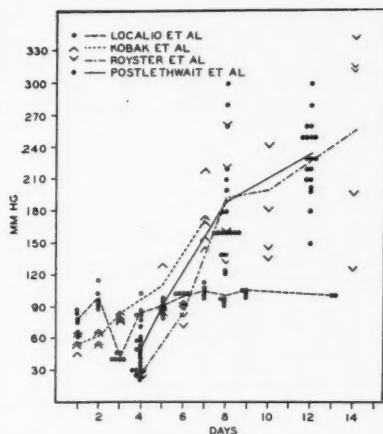


Fig. 4. A comparison of three recently reported studies with the present series.

A series of 60 rats were tested by this method. Two rats died before and 2 after the original wounding. Only 2 other rats could not be used. In 1, the skin had separated although the deeper layers appeared well healed. In the second, a tag of omentum protruded from the lower point of the wound. No infections were serious enough to warrant discarding the animal. The infection rate was

10.7 per cent, and consisted mainly of minor infection about one or more sutures. No deaths were due directly to the testing. Nine rats died up to 12 days after the first disruptions; 4 deaths were due to anesthesia. The results are shown in Figure 3. These are compared (fig. 4) with three other studies of wound healing: Royster, McCain and Sloan⁴ who tested excised strips from the dog's abdomen using a tensiometer recording in Gm., Localio, Morgan and Hinton⁵ who distended the abdomen of rats with air introduced through a needle until disruption occurred, recording in millimeters of mercury, and Kabak, Benditt, Wissler and Steffee⁶ who used essentially the same method by placing a balloon in the abdomen and distending the balloon.

It is obvious from a study of the diagram of the testing instrument that serious sources of friction still remain and must be eliminated. Whereas this objectionable feature is readily acknowledged, it is felt that the instrument and method will be of value in the study of wound healing.

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INTRAVENOUS EVIPAL SODIUM-DECAMETHONIUM BROMIDE† TO FACILITATE ENDOTRACHEAL INTUBATION: A CLINICAL STUDY

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EMILY FERRARA, M.D.*

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ENDOTRACHEAL intubation antedates anesthesia itself by several centuries. Hippocrates suggested the possibility in certain inflammatory conditions of the larynx,¹ and Vesalius introduced a tube into the trachea over four hundred years ago.² This procedure is employed today as an adjunct to anesthesia, as an integral part of respiratory and circulatory resuscitation, and in the diagnosis and therapy of certain pulmonary pathology.

A rapid, yet safe method of producing adequate anesthesia for endotracheal intubation is desirable in patients who show pulmonary pathologic changes which slow gaseous diffusion (emphysema, secretion, bronchospasm). It is desirable in patients who have a decreased tidal exchange (intestinal obstruction with distention), a mechanical obstruction of the airway, anatomical abnormalities of the face, or coughing paroxysms following induction of anesthesia. With these individuals in mind, a modification of a previously described technic³ has proven to be of great value under these difficult circumstances.

METHOD

A solution was prepared in a 10 c.c. syringe consisting of 4 mg. decamethonium bromide (4 c.c.), 5.6 c.c. of sterile distilled water and the contents of a freshly-opened .5 Gm. ampule of Evipal Sodium. Each cubic centimeter of this solution contained 50 mg. of Evipal Sodium and .4 mg. of decamethonium bromide.

All patients received moderate preliminary medication at a time and by a route which assured maximum effects before induction. This consisted of an opiate and belladonna derivative in a 25 to 1 ratio. Isonipeccaine was frequently employed to avoid any possible bronchoconstriction induced by morphine.⁴ An amended position of the head,⁵ and the McIntosh laryngoscope⁶ were used to provide exposure of the larynx prior to and during intubation.

The Evipal-decamethonium bromide solution was administered

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†Winthrop-Stearns, Inc., and Burroughs Wellcome and Co., supplied the Evipal and Syncurine used in this clinical research.

intravenously in small, fractional dosages. Initial injection of 4 to 7 c.c. in divided dosages produced light surgical anesthesia in the majority of patients. Supplementation with 75:25 nitrous oxide-oxygen, cyclopropane, or a topical spray of tetracaine to the pharynx and larynx were employed at this time in some cases. After awaiting two to five minutes for maximum effects, 2 c.c. doses of the prepared solution were given intermittently until intercostal activity was obviously decreased and the patient was deep enough for easy exposure of the larynx.

Following intubation, anesthesia was maintained with the closed system. Artificial respiration by manual, rhythmic compression of the breathing bag was employed to oxygenate the patient in cases where apnea or reflex straining on the endotracheal tube occurred.

RESULTS

This combination was administered to 116 patients to facilitate oral, endotracheal intubation prior to surgery. The series was composed of 92 Caucasian and 24 Negro patients, 67 males and 49 females, ages ranging from 7 to 94 years, emergency and elective surgical procedures, and operations varying from a tooth extraction to ligation of a patent ductus arteriosus.

TABLE I
Results

Agents Employed		No. of Cases	Range of Dosages Mean Dosage	Clinical Observations
Evipal and Decametho- nium bromide, plus (116 patients)	Alone	29	7-10 c.c. 9.1 c.c.	Deep anesthesia necessary to prevent straining on endotracheal tube. 2 cases of apnea.
	75:25 Nitrous oxide	7	5-8 c.c. 8.4 c.c.	No straining on endotracheal tube as a general rule. No cases of apnea.
	Cyclopropane	6	4-8 c.c. 6.9 c.c.	Rarely strained on endotracheal tube. 3 cases of apnea.
	2% tetracaine	64	6-10 c.c. 9.3 c.c.	Required longer to intubate. Rarely strained on tube. 6 cases of apnea.
	Anesthetic agent plus 2% tetracaine	9	4-10 c.c. 7.8 c.c.	No straining on endotracheal tube. No cases of apnea.
	Miscellaneous combinations of anesthetic agents	1	8 c.c.	Large emphysematous patient. Received cyclopropane, ether, and tetracaine. Apneic 2 minutes.

All attempts at intubation were successful, and were accomplished within 4 to 9 minutes with a mean time of 7 minutes from induction to intubation. Multiple exposures of the larynx were necessary in 3 cases because of technical difficulties with the equipment, yet no marked laryngospasm or cyanosis appeared in any of the cases.

Certain clinical observations were recorded about each combination of agents employed.

A tabulation of all reactions showed an overall incidence of 12.9 per cent.

TABLE II
Reactions Encountered

Initial fall in blood pressure (over 20 mm.)	3 patients
Apnea (over 10 sec.)	12 patients
Laryngospasm	0 patients
Cyanosis	0 patients
Deaths—none immediate. 1 death 6 days postoperatively from pulmonary embolism (autopsy).	
Excitement and disorientation—none.	

DISCUSSION

This combination of Evipal (sodium n-methyl-cyclo-hexenyl methyl barbituric acid) and decamethonium bromide, from a pharmacologic standpoint, provides rapid anesthetic depression of the central nervous system and relaxation of striate muscles. Because these agents are rapidly detoxified by the body, the emergence is also rapid. The intravenous method of administration provides an alternative route of administering an anesthetic agent.

The addition of an inhalation anesthetic agent prior to endotracheal intubation reduces the amount of Evipal-decamethonium bromide solution necessary for intubation, and tends to prevent straining following tracheal stimulation. The topical addition of 2 per cent tetracaine spray to the larynx before intubation also markedly reduces the incidence of straining. Whenever this latter procedure is employed; it requires more Evipal-decamethonium bromide than when the tetracaine is not employed. This is attributed to multiple laryngoscopy necessary to apply the tetracaine. The simultaneous administration of the intravenous agents, an inhalation anesthetic agent, and topical 2 per cent tetracaine is followed by no straining at the time of intubation. This combination reduces the total amount of intravenous Evipal-decamethonium bromide necessary for the intubation and produces no greater incidence of apnea.

SUMMARY

Intravenous Evipal-decamethonium bromide was employed alone and in combination with various anesthetic agents to facilitate endotracheal intubation prior to surgery.

The combination is briefly discussed from both pharmacological and clinical standpoints.

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RAPID ANTIBIOTIC SENSITIVITY TESTS ON AEROBIC ORGANISMS ASSOCIATED WITH CHRONIC ULCERS*

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"He is a good Surgeon who can amputate a limb, but
he is a better Surgeon who can save a limb."

—Sir Astley Cooper.

THAT the microbiologist may be of significant assistance to the surgeon in the establishment of a diagnosis, in the particular case of certain types of surgical infections such as chronic ulcers, has been well and ably delineated by Meleney.^{1,2} Improved laboratory technics, with particular reference to those in which potentially therapeutic antibiotics are the subjects of test, have become increasingly important since reliable correlation between laboratory findings and clinical response has been determined. The responsibility of the microbiologist in the determination of specific etiologic organisms and in the testing of isolates from infections for sensitivity to indicated drugs has, therefore, become routine in many treatment centers. It is the purpose of this paper to discuss the results of the examination of typical patients observed at the Roper Hospital and the Medical College Out-Patient Clinic during the past summer.

In 1945 Morley³ reported a simplified technic for testing microorganisms isolated from wounds for sensitivity to penicillin and sulfathiazole. O'Toole,⁴ Bondi, et al.,⁵ and Scott,⁶ have more recently expanded the methods by Morley and, by simplification and standardization, placed these tests within the scope of routine hospital laboratory procedures. The technics used by the investigators cited above are essentially those of the aerobic cultivation of organisms in the presence of gel-diffused test solutions.

Basic laboratory procedures used during the present study did not deviate from accepted practice and followed the routine proposed by the authors cited above. The specimens obtained, which included pus, necrotic tissue, and tissue taken by biopsy, were heavily streaked on half the surface of a blood agar plate (10 per cent sheep's blood). To this portion of the plate small discs of filter paper previously saturated with the various antibiotics under study were added; the remaining half of the plate was more lightly inoculated with the specimen to facilitate identification of organisms

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present. The inoculated plates were then incubated at 37° C. for 24 hours at which time observations for reaction were made, Gram stain of colonies performed for the provisional identification of organisms and colonies transferred to appropriate media for final identification. A typical plate, after incubation, is shown (fig. 1).

TABLE 1

Concentration of test solutions and interpretation of resulting zones produced after incubation of test plates.

Antibiotic	Conc. of test solution	Zone in Millimeters			
		Very susceptible	Moderately susceptible	Slightly susceptible	Resistant
Aureomycin	500 mcg/ml	17	13-17	8-13	8
Chloromycetin	700 mcg/ml	20	15-20	10-15	10
Penicillin	50 units/ml	25	20-25	10-20	10
Streptomycin	500 mcg/ml	15	10-15	*	10
Terramycin	500 mcg/ml	17	13-17	8-13	8

*Not determined.



Fig. 1. Results of antibiotic sensitivity tests in which positive reactions to test drugs were detected. Patient: S. B., Hosp. No. 97,643, 12/3/50; *Micrococcus pyogenes* var. *aureus*, (*Staphylococcus aureus*), coagulase positive, resistant to chloromycetin and penicillin, very susceptible to aureomycin, streptomycin and terramycin.

Using these technics, and interpreting the results in accordance with the data of Bondi, et al,⁵ Scott,⁶ and Anderson,⁸ as outlined in Table 1, approximately 25 surgical infections were studied; the results of the laboratory test on 8 typical cases are given in Table 2.

TABLE 2

Results of the microbiological examination of eight typical cases included in the present study.

Results of Antibiotic Sensitivity Tests*

Patient	Chart No.	Organisms found	Aureo- mycin	Chloro- mycetin	Peni- cillin	Strepto- mycin	Terra- mycin	Comments
J.P.	53265	<i>Pseudomonas aeruginosa</i>	R	MS	R	MS	SS	Ulcer following osteomyelitis, lower third, left tibia. Onset, May 1950.
S.Y.	20913	<i>Alcaligenes fecalis</i>	R	R	R	MS	MS	Ulcer since 1942; varicose veins lower extremities.
S.W.	86689	<i>Pseudomonas aeruginosa</i>	R	VS	R	VS	SS	Ulcer following trauma to area of varicose veins (lower extremities) since Sept. 1949.
M.G.	117128	<i>Pseudomonas aeruginosa</i> , <i>Proteus vulgaris</i>	R	VS	R	SS	SS	Diabetic; varicosities arteriosclerosis peripheral vessels. Ulcer since Dec. 1949.
M.T.	63450	<i>Micrococcus pyogenes</i> var. <i>albus</i>	MS	SS	MS	SS	MS	Recurrent ulcers past 4 years.
M.M.	73960	<i>Proteus vulgaris</i>	R	MS	R	SS	SS	Ulcer following ankle burn Dec. 1949.
M.D.	45043	<i>Alcaligenes fecalis</i>	R	MS	R	R	SS	Ulcer since May 1950 following traumatic injury to lateral aspect left ankle.
C.K.	72751	<i>Micrococcus pyogenes</i>	VS	MS	R	R	VS	Ulcer following dog bite, left leg, June 1949.

*Abbreviations appearing in the Table are: R—resistant; SS—slightly sensitive; MS—moderately sensitive; VS—very sensitive.

As Meleney¹ has shown, it is to be expected that a wide variety of microbial species will be found associated with wound infections; these reported findings were confirmed by the present study (Table 3). The difficulty of the assessment of the significance of the presence of a given isolate as the etiology of the patient's disease is appreciated. It must be admitted that some of the organisms found could, and probably are, contaminants; only by continued reisolation of identical organisms and perhaps by a clinical cure affected by the use of therapeutic agents to which the organisms present were known to be sensitive could a more reliable statement of etiology be established.

TABLE 3

Incidence of the various organisms found in 25 cases of chronic ulcers

Organism isolated	Number	Per Cent
<i>Micrococcus pyogenes</i> var. <i>aureus</i> (<i>Staph. aureus</i>)	14	49
<i>Micrococcus pyogenes</i> var. <i>albus</i> (<i>Staph. albus</i>)	3	10
<i>Pseudomonas aeruginosa</i>	5	17
<i>Alcaligenes fecalis</i>	3	10
<i>Proteus</i> sp.	3	10
Coliform bacilli	1	3
Total*	29	

*In 4 cases more than one organism was isolated.

The results of these investigations show clearly that not only is the etiology of surgical infections, of the type available for study, extremely variable, but more important, the degree of susceptibility of the exciting organisms is very inconsistent with preconceived and/or expected reactions. Each clinical case presents a separate entity, and the anticipated results from the use of antibiotics cannot be projected unless tests, as performed, have been carefully completed. It should be emphasized that one advantage of the present test is the rapidity with which it can be performed; in surgical infections of long duration this may not be an important factor. It is felt, however, that if the need for early results of this type are desired, that the laboratory now has a reliable method to assist the surgeon in his choice of a therapeutic agent or agents. It has not been too long since the identity of an etiologic organism was the primary reason for the microbiological examination of infected surgical wounds; the more modern approach seems to be not so much the determination of the name of organisms present, but a description of the general type of organism causing the patient's illness, and a reliable forecast of results that may be expected by the use of tested therapeutic agents.

In order that the type of tests described above may be more easily performed, recent development of the use of antibiotics incorporated in tablet form in the sensitivity tests has been proposed. The results of Hoyt and Levine⁷ and reports from commercial producers of antibiotics indicate that this easily performed test, using tablets, may, at an early date, obviate the preparation of solutions and the task of saturating small discs. This laboratory now has such evaluation studies in progress, the results of which we hope to publish at an early date.

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HEMORRHOID THERAPY WITH MINIMAL DISCOMFORT*

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HEMORRHOIDS and their complications probably represent one of the most common problems encountered in general surgical practice. Every general surgeon is frequently called upon to treat hemorrhoids, and, like most surgical procedures, the majority of hemorrhoid therapy is handled by the general surgeon rather than by a specialist in this field. The management of these lesions is one which, if done properly, will insure a most grateful and satisfied patient, while the person who has had a poorly performed procedure will remain unrelieved, bitter, and frequently in worse condition than prior to operation.

Most patients who present themselves for rectal surgery are extremely apprehensive, since they have all listened to accounts of excruciating pain, agony and torture endured by others who have undergone operation previously. Though unquestionably the degree of suffering is usually exaggerated, still in many cases the postoperative discomfort is sufficiently great as to encourage many who have rectal complaints to seek out quacks who advertise "painless pile treatment." These treatments by unqualified individuals are usually inadequate, poorly advised and often dangerous. Thus, it is obvious that this unhappy situation can be corrected only if surgeons will interest themselves in measures which will result in the most satisfactory and least painful healing of the lesions.

One of the principal reasons that hemorrhoidectomy is so dreaded by the patient and so frequently accompanied by complications is that it has been considered by many a minor procedure, and frequently someone who would not perform even an appendectomy or a herniorrhaphy has no qualms about attempting to repair a mass of prolapsed strangulated hemorrhoids. There is always "open season" on the rectum by some surgically over enthusiastic individuals, and the incidence of stricturing, perirectal abscesses and fistulae after their manipulations is alarming. In order to perform satisfactory rectal surgery, it is absolutely necessary that the physician must have a detailed knowledge of the anatomy, physiology and pathology of the rectum. It is also essential that the operator should have had competent training not only in the technical aspects of the operative maneuvers, but supervised management of the patient in the postoperative phase. Only in this way can the young

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surgeon learn not only the correct procedure for each individual case, but the need for careful, thorough postoperative care without which the most technically perfect operation may fail to obtain the desired result.

The management of hemorrhoids depends principally upon the type encountered when the patient is first seen. Clinically, hemorrhoids are classified as internal, external and mixed, according to their location. The treatment varies with the degree of advancement and the location, the age of the patient, the predisposing causes and the presence or absence of complications.

Internal hemorrhoids are varicosities of one or more radicles of the superior hemorrhoidal veins and have their origin above the anorectal line. During the early stage of their development, they are small, compressible and covered with normal mucous membrane. Because of the anatomic distribution of the superior hemorrhoidal veins, they are usually fairly constant in position, being located most frequently in the right and left posterior and right anterior quadrants. At this time, the primary phase, the only symptoms are usually occasional bleeding during or following defecation, a sense of fullness in the rectum, and occasionally such reflex disturbances as constipation, pain in the back and down the thighs, and bladder symptoms, chiefly frequency of urination and dysuria.

In our experience, injection treatment proves eminently satisfactory with hemorrhoids while they are still internal, uncomplicated and not too far advanced. This procedure enjoys the advantages that, when properly done in selected cases, it is completely painless, the patient remains ambulatory, and no hospitalization is required. Unfortunately, only about 50 per cent of hemorrhoid patients are suitable for this type of therapy, because at this stage many are administering self treatment with various salves, ointments and suppositories in the vain hope that the condition will recede, and do not consult a physician until the hemorrhoids have become external, fibrotic, thrombotic, ulcerated or strangulated, at which time injection treatment is contraindicated.

When injection treatment is decided upon, some suitable sclerosing solution, preferably quinine and urea hydrochloride in 5 per cent aqueous solution, is injected immediately submucosally at the base of the hemorrhoidal mass. This causes a sterile fibrotic reaction which gradually obliterates the varicosities. The needle is introduced into the submucosa, never into the vein itself. Usually about $\frac{1}{2}$ to 1 c.c. of solution is injected around the base of each hemorrhoid. Usually two hemorrhoids are injected at each visit. Each hemorrhoid generally requires two or three injections for maximum shrinkage. The

injections are spaced at regular intervals of 7 to 10 days apart. When the hemorrhoids are properly injected above the anorectal line, there should be no pain, though the patient may mention a slight feeling of fullness in the rectum for a day or two after treatment. We have not noted possible complications such as sloughing, abscess formation, stricture or fistulae. If the patient has an idiosyncrasy to quinine, phenol or sodium morrhuate may be substituted. No particular after care need be advised except the prevention of constipation with some standard lubricant. In our experience, properly performed injection treatment in well selected cases gives satisfactory and permanent results. It is particularly gratifying to use when the indications are present in the aged, during pregnancy, and in those debilitated by other more serious and disabling illnesses.

As hemorrhoids advance and become more fully developed, they become larger, more elongated and frequently prolapse at the time of defecation. The patient finds it increasingly more difficult to reduce them. Bleeding may not be as marked because of gradual submucosal fibrosis, unless ulceration of the mucous membrane occurs. However, pain and discomfort is common because of the presence of the hemorrhoidal masses, and fissures and cryptitis are often seen leading to accentuation of the pain, itching and exaggeration of the reflex symptoms noted above. At any time, this chronic, gradually progressive condition may be complicated by acute thrombosis of one or more of the masses or the development of an irreducible prolapse of the hemorrhoids with subsequent strangulation.

There is no satisfactory expectant or conservative treatment for hemorrhoids after they have passed the internal, early phase. Injection treatment at this stage is contraindicated. Bed rest, lubricants, astringent suppositories, salves and solutions are merely palliative, and at best can only delay the inevitable need for surgical intervention.

Mixed, thrombotic and prolapsed hemorrhoids are surgical problems, and any other approach carries with it the possibility of recurrence, unsatisfactory results or even disaster.

Thrombotic hemorrhoids are characterized by their sudden, painful onset with the appearance of a tense, purplish, firm, circumscribed, rounded mass at the anal margin. They are usually about 1 cm. in diameter and may be multiple. They are the result of rupture of a perianal vein, and are circumscribed blood clots under redundant folds of anal skin. They are usually a complication of prolapsing internal or mixed hemorrhoids. The condition can

usually be painlessly relieved in the office by infiltration of procaine in the skin and evacuation of the clot through a small radial incision directly over the lesion. A nicety appreciated by the patient is the freezing of the skin in this sensitive region with ethyl chloride before inserting the needle to introduce the procaine. After treatment consists in the administration of mineral oil to prevent constipation, and hot sitz baths twice daily during the healing period. Anoscopic examination should be done after the soreness has subsided, and, in most cases, an elective hemorrhoidectomy must be advised.

Prolapsed, strangulated hemorrhoids represent a serious complication of prolapsing internal or mixed hemorrhoids. Frequently, the physician first sees the patient at this stage, though for years he may have been having pain, bleeding and prolapsing of hemorrhoids, but has deferred seeing a physician, and has tried various types of remedies prescribed by a pharmacist, substandard practitioner or quack. On examination, one finds a circumferential ring of prolapsed hemorrhoids which are irreducible, edematous, hyperemic or cyanotic, indurated, ulcerated, and often show signs of impending gangrene. The clinical appearance often is that of a swollen, firm, purplish-red rosette of tissue protruding from the rectum which is exquisitely painful and tender, and which cannot be reduced. Treatment consists of complete bed rest with the hips elevated, hot applications locally and sedation. If the lesions appear to be subsiding satisfactorily in two or three days, the treatment should be continued until all edema has disappeared, at which time an elective hemorrhoidectomy should be done. If the edema and induration show no evidence of disappearing in 72 hours, and particularly if gangrene appears imminent, the patient should be taken to the operating room and the lesions opened by multiple incisions to release the clotted blood and edema fluid. After the swelling has receded and the previously strangulated masses can be reduced, an elective hemorrhoidectomy should be done before discharge of the patient.

When a patient presents himself for hemorrhoidectomy it is usually because all lesser measures have failed or he has been nudged into it by repeated episodes of prolapse, thrombosis or strangulation. One may be sure he has tried all the various analgesic and astringent suppositories on the market, and he has often consulted various physicians, naturopaths and chiropractors before coming to the conclusion that surgery is his only hope of cure. These people need reassurance, and the physician who accepts the case should be able to state unequivocally to them that the postoperative discomfort will not be as severe as previous pain they may have had from prolapse, thrombosis, ulceration or cryptitis.

The patient for hemorrhoidectomy is admitted the afternoon before operation. He is prepared perianally. A cleansing enema is given and repeated until the returns are clear. A barbiturate is given at the hour of sleep. One hour preoperatively, he is given (in the average sized individual) 100 mg. demerol and 1/150 gr. scopolamine.

The position of the patient on the operating table is optional, either in lithotomy or on the abdomen with the table broken in the middle and the buttocks strapped apart with adhesive. We find that a low spinal anesthesia using 75 mg. of novocaine crystals with $\frac{3}{8}$ gr. ephedrine introduced intrathecally through a 22 gauge needle gives a satisfactory anesthesia, both as far as the area of block and the duration of anesthesia is concerned. After the patient is in position and anesthetized, it is advisable to carry out a sigmoidoscopic examination to rule out the possibility of a rectal polyp or neoplasm as the true cause of the patient's bleeding.

If no lesions other than the hemorrhoids are discovered, the sphincter is gently ironed out to obtain more complete exposure of the operative field. One usually will find three main groups in the right and left posterior and right anterior quadrants. Secondary satellite groups may be present in the more advanced cases between the main groups. There may be present varying degrees of ulceration and thrombosis. The principal hemorrhoidal masses are grasped with forceps. An incision is then made in the mucous membrane and skin overlying the hemorrhoidal lesion under consideration. The veins are dissected upward toward the base and the vein and artery ligated. By careful subcutaneous and submucosal dissection, all hemorrhoidal veins can be dissected out completely. The skin and mucous membrane in excess of the amount necessary to cover the raw areas are excised. We usually close the defect with a continuous suture of plain 00 catgut.

We are now ready to consider methods to allay the postoperative discomfort of the patient. First of all, we usually make multiple incisions in the perianal skin in a radial direction to allow free drainage of the blood and edema fluid, and consequently minimize postoperative edema of the region. No packing or tubes of any kind are employed. Next, we perform a sphincterotomy, usually directly posterior. It is our impression that much of the pain after hemorrhoidectomy is due to anal sphincter spasm, since we have noted that most patients in whom both hemorrhoids and a fissure were excised, and in whom a sphincterotomy was done for cure of the fissure, were much less uncomfortable than the hemorrhoidectomy patient without sphincterotomy. It is necessary to cut only the superficial fibers of the external sphincter which heal up quickly, uneventfully

and without incontinence, but which markedly decreases anal spasm during the immediate post hemorrhoidectomy period.

The third measure which we have found quite effective in controlling posthemorrhoidectomy pain is the subcutaneous and submucosal infiltration of 95 per cent alcohol. We first began to employ this agent routinely about two years ago after observing that individuals whose perianal regions we had infiltrated with alcohol primarily for nonspecific pruritus ani, and who also had some hemorrhoids excised at the same time, enjoyed a completely painless postoperative course. We have used the technic advised by Bacon in which 95 per cent alcohol is suffused under the skin and mucous membrane up to the anorectal line and out to about 6 cm. in all directions around the anus. Observing the precautions outlined by Bacon that the alcohol not be injected intradermally, and that only a small amount be injected in any one area, we have had no slough or infection. The patients are usually anesthetic in the injured area for about 6 to 12 weeks, at the end of which time the normal sensation usually returns. By this time, the hemorrhoidectomy is all healed, and the patient is only too glad to substitute a transient anesthesia for severe postoperative pain. We have been very disappointed in the use of various cocaine derivatives suspended in oil, since the results are uncertain and the danger of oleomas is ever present.

Postoperatively, the patient is given a low residue diet, sedation if needed, and is allowed up after 10 hours. Seldom does one see the common reflex bladder neck spasm requiring catheterization, particularly if the patient is allowed to be up to void. Usually there is no pain at all, though some individuals may mention a feeling of fullness in the rectum. Warm applications to the rectum are usually comforting. On the traditional third day, we usually evacuate the lower colon with an enema, having started the patient on a lubricant the night before. To allay apprehension, it has been our custom to order 100 mg. demerol or $\frac{1}{4}$ gr. morphine one hour before the first postoperative enema. Two hundred c.c. of mineral oil is then instilled into the rectum through a small rectal tube or catheter, and two hours later a soapsuds solution is given, also through a small rectal tube or catheter. Warm sitz baths are begun the day after operation, and continued twice daily thereafter until healed. We have found the most satisfactory type of rectal dressing to be a sanitary napkin held in place with a sanitary belt and liberally smeared with an ointment to prevent sticking to the healing surfaces. Beginning about the fifth day, and repeated every five days until complete healing, a digital examination is gently done to keep the raw edges separated as they epithelialize, and to guard against

any tendency to stricture. The patient is allowed to be up and about from the first postoperative day, and can usually plan to return to work in 10 to 14 days. It is advisable to do a final examination in six weeks after operation to check the rectal lumen. At this time, any redundant skin tabs which remain may be clipped off with local procaine infiltration, particularly if the patient is conscious of them.

CONCLUSION

Under such a regimen as has been outlined, one can assure the patient suffering with hemorrhoids or their complications a satisfactory, permanent result with a minimum of pain.

SUMMARY

1. Hemorrhoids are a very common surgical problem, and their management should be undertaken with skill and meticulous care to obtain the best result.
2. Fear of pain is often the principal factor in causing patients to defer treatment or drifting into the hands of incompetent individuals.
3. Injection treatment gives satisfying results in early, internal hemorrhoids.
4. Measures to minimize posthemorrhoidectomy discomfort include (a) perianal skin incisions, (b) sphincterotomy, and (c) subcutaneous and submucosal alcohol infiltration.

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APPENDICO-CECOSTOMY IN THE TREATMENT OF ADVANCED APPENDICITIS*

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IN CASES of advanced appendicitis where the appendix is removed, conditions are most unfavorable for a satisfactory closure of the appendiceal stump, whether by simple ligation or inversion. To attempt such is to violate the principles of safe intestinal surgery. Leakage of intestinal contents may result from interference with healing by local infection or from increased intraluminal pressure in the cecum, in which case the contamination is of such degree that it is not taken care of locally, and the resultant infection spreads along the paths of least resistance. Properly placed drains may direct the purulent exudate and fecal material to the outside, thus preventing a spread, but not infrequently the use of drains serves only to alleviate the condition, and at times has no deterring effect upon the spread of the infection. It may even be a provocative factor in causing leakage at the appendiceal stump. Patients with spreading infection from leakage at the appendiceal stump are seriously ill, and in general are relieved only by drainage—spontaneous or operative—of the inflammatory process through the operative incision, or elsewhere, to the outside. The subsequent course is complicated by such conditions as wound infection, fecal fistula, intra-abdominal abscesses, and other manifestations of sepsis. A number of such cases do not recover.

Leakage at the site of the stump of the appendix can be reduced to a negligible amount by preventing increased intraluminal pressure in the cecum. A tube inserted through the stump of the appendix into the cecum and brought out through the abdominal wall incision satisfactorily accomplishes this purpose. With no added contamination from leakage of intestinal contents, the infection already present more readily subsides. There results a fistula from the cecum to the operative incision along the lateral wall of the peritoneal cavity. When this tract has well formed and local infection has subsided, the removal of the tube is followed by almost immediate closure of the tract.

The value of this procedure has been known for a number of years, and it has been well described.^{1,2,3,4} In spite of its merits, it seems to be used comparatively little, judging by the few references to it in literature. The proper use of decompression of the cecum

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by appendico-cecostomy reduces to a minimum the morbidity and mortality in cases of advanced appendicitis. Needless to say, it is used in conjunction with generally accepted measures such as drainage as indicated, stomach and intestinal intubation to prevent and relieve gaseous distention, and antibiotics.

THE TECHNIC

The appendix is removed, care being taken not to mobilize the cecum or to disturb the neighboring structures. If the appendix is involved in an inflammatory mass and adherent to surrounding structures, the mucosa with the submucosa should be stripped out, in whole or in part, leaving the serosal layer and mesappendix undisturbed. A size 16F or 18F mushroom or male catheter is passed through the appendiceal stump into the cecum. The stump may then be inverted, simply ligated, or in some cases neither. The proximal end of the catheter is brought out along the lateral abdominal wall through the operative incision. A McBurney incision is decidedly preferable, and the catheter is brought out through it along with the drains. Should a more medial incision have been used, it is advisable to make a small muscle splitting incision of the McBurney type for the exit of the catheter and drains. The catheter in no case should be brought out through a stab wound as this may result in a serious infection in the abdominal wall due to introducing contamination in the presence of inadequate provision for drainage between the layers and to the outside. No attempt should be made to suture the cecum to the anterior abdominal wall. Drains are placed as indicated and the wound is loosely closed; delayed closure of the skin and subcutaneous layer is often advisable. Care is taken to keep the catheter open by injecting into it a small amount of water every two to four hours.

While gas may escape through the tube, there is no significant drainage of intestinal contents until peristalsis is resumed. The drainage then may be of any degree from scant to voluminous. The catheter is not removed until all the drains are out and the purulent discharge from the wound has practically ceased—usually in 7 to 14 days. The wound then consists of little more than the external opening of a well-formed fistulous tract to the cecum. The catheter may be withdrawn or shoved into the cecum to be passed by rectum. Usually the tract closes without further drainage of intestinal contents, and wound healing progresses to completion. In case of a slowly healing wound, the patient may be discharged from the hospital with the catheter still in place, but cut off so that it can drain into the dressing, until time for its removal.

CASE 1. Roper Hospital No. 92,341. J. H. M., a colored male 11 years of age, was admitted July 1, 1950, with a diagnosis of acute appendicitis. At operation on the same day, through a McBurney incision there was found pus exuding from the pelvis. The appendix showed advanced suppuration and had a perforation in the middle third. The omentum was adherent to the distal half. The neighboring peritoneum was reddened and edematous. The appendix was removed. A No. 16F male catheter was passed through the stump of the appendix into the cecum. The stump was inverted with a cotton suture. Penrose drains were placed in the pelvis, the right lumbar gutter and to the region of the appendix. The drains and catheter were brought out through the operative incision which was loosely closed. Postoperatively gastric suction was instituted, and penicillin and dihydrostreptomycin were administered. For the first two postoperative days there was a moderate degree of abdominal distention and the temperature reached 101° F. On the third day there were a number of soft bowel movements. There developed a boggy mass in the pelvis which subsided during the next few days. There was a moderate amount of purulent discharge from the wound, and some fecal drainage through the catheter. The drains were gradually withdrawn from the seventh to the eleventh postoperative day. On the thirteenth day the temperature had been normal for several days and there was minimal discharge from the wound. The cecostomy tube was withdrawn. There was no subsequent discharge of fecal material. The wound healed shortly thereafter.

CASE 2. Roper Hospital No. 81,492. E. S., colored female, 22 years of age, gravid iii para ii was admitted to the Roper Hospital October 23, 1950, with a diagnosis of appendicitis with abscess formation. She was six months pregnant. Operation was performed on the day of admission. Through a McBurney incision the appendix was found to be the site of an abscess. The appendix was removed, minus its serosal and muscular layers. The stump was inverted. Three Penrose drains were placed to the region of the appendix and brought out through the incision. The wound was closed loosely. The following day there was distention of the abdomen and an elevation of temperature. An attempt was made to use gastric and intestinal suction, but the tubes were poorly tolerated and repeatedly withdrawn by the patient. The distention increased to such a degree that it seriously interfered with respiration. The temperature ranged from 102° F. to 104° F. She was critically ill. On October 29, the sixth postoperative day, she aborted while an x-ray examination was being made. A few hours later she complained of a sudden severe pain in the right lower quadrant. The following day there was spontaneous drainage of a large amount of pus and fecal material from the operative wound. As the distention was still most pronounced, a Witzell enterostomy was made under local anesthesia. During the next few days the distention gradually subsided, she had watery bowel movements, and from the McBurney incision there was a profuse discharge of liquid intestinal contents which gradually diminished over the next two weeks. The temperature remained high. There developed an empyema thoracis which was poorly localized. This was treated at first by repeated thoracenteses, and later by resection of a segment of the fifth rib, and still later a segment of the ninth rib. Occlusion of the enterostomy tube resulted in increased distention and vomiting, so that it could not be removed before the thirtieth postoperative day. In addition to the usual supportive treatment, she was given oxygen almost continuously for the first three weeks after operation. Penicillin, streptomycin, aureomycin, and sulfonamides were administered in large amounts. On December 7 a right subphrenic abscess was drained through the bed of the twelfth rib. On December

8, her general condition was good, both abdominal incisions were practically healed, and the drainage of the left pleural cavity appeared adequate. She was expected to make a satisfactory recovery.

COMMENT

In the first case conditions were such that leakage at the appendiceal stump might have been expected. An appendico-cecostomy was performed. The recovery was uneventful. In the second case there occurred leakage at the appendiceal stump which was not taken care of by the drains. From the resultant infection partial relief was afforded on the sixth postoperative day by spontaneous discharge from the incision of a large volume of purulent exudate and fecal material. Subsequent complications included general sepsis, persistent small bowel obstruction and empyema thoracis. As the complications in this case could be attributed to leakage at the appendiceal stump, it is reasonable to assume that they would not have occurred had the appendico-cecostomy been performed.

An appendico-cecostomy should be performed in those cases of advanced appendicitis in which the appendix is removed and drainage is indicated. By so doing, protection is afforded against leakage at the appendiceal stump, the source of the most serious complications. In the few cases in which it is done unnecessarily, the only harm resulting is a slight increase in the hospital stay.

SUMMARY AND CONCLUSIONS

1. Appendico-cecostomy gives protection against leakage at the appendiceal stump and should be performed in those cases of advanced appendicitis in which the appendix is removed and drainage is indicated.
2. Two illustrative cases are presented.

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AUREOMYCIN TREATMENT OF RECTAL STRICTURES*

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THIS is a report of the treatment of rectal strictures of lymphogranuloma venereum with aureomycin. Twelve cases were treated and were followed from 1 to 18 months. The purpose of the study was to determine the effect of aureomycin in cases of rectal strictures due to lymphogranuloma venereum and to note the duration of the beneficial results.

Wright and his associates¹ were the first to use and to report on aureomycin in the treatment of lymphogranuloma venereum. Prigot and his co-workers² reported further on their experiences at the Harlem Hospital with aureomycin and lymphogranuloma venereum. There have been other^{3,4,5} reports on the treatment of lymphogranuloma venereum with aureomycin.

Method of study

From a group of clinic patients, 12 Negro women with rectal strictures were selected at random for this study. Their ages ranged from 18 to 61 years, with the average age being 40½ years. They dated the onset of symptoms of their rectal strictures from 6 months to 13 years.

In order to better study the cases some of the patients were hospitalized. All received a detailed history with particular attention to symptoms relating to the rectal lesion. Each received a physical examination including an anoscopic examination. When it was possible a sigmoidoscopic examination was also performed. Biopsies were obtained in each case before aureomycin was given. This is of paramount importance because at the Roper Hospital there have been a few cases of rectal carcinoma appearing in patients with rectal strictures of lymphogranuloma venereum. A biopsy is, therefore, necessary to rule out a malignancy.

The laboratory work-up included complete blood counts, hemoglobin, urinalysis, serological tests for syphilis, total and fractional serum proteins, complement fixation tests, and Frei tests.

In order to strive for uniformity in describing the strictures, a

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Aureomycin was supplied through the courtesy of the Lederle Laboratories Division of the American Cyanamid Company.

classification by Wright, Freeman, and Bolden⁶ was adopted as follows:

STRICTURE

Type: Annular or tubular: single or multiple (over 1.5 cm. in length is to be considered tubular).

Consistency: Soft, hard, firm, regular, irregular (encircle adjectives).

CLASSIFICATION OF TYPES

Type 1. Soft, smooth and regular due to mucosal edema and congestion.

Type 2. Hard and irregular with granulomatous deposits in the mucosa and submucosa.

Type 3. Small amount of scar tissue in the submucosa and muscularis.

Type 4. Dense scar tissue in all layers of rectum and perirectal tissues.

GRADING ACCORDING TO SIZE OF DIAMETER

<i>Grade 1</i>	1½ inches	3.7 cm.
<i>Grade 2</i>	1 inch	2.5 cm.
<i>Grade 3</i>	½ inch	1.2 cm.
<i>Grade 4</i>	¼ inch	.6 cm.
<i>Grade 5</i>	admits none	

Distance from anus

The limitations of accurately measuring rectal strictures are frankly admitted. It is even more difficult to accurately (objectively) measure the changes in the rectal strictures during and after aureomycin therapy. Because of this technical difficulty, more reliance has been given to the patient's symptoms and interpretation. The patients' statements have, therefore, been carefully considered and evaluated.

The reliability of a clinic patient's story may be open to question. But, when it is considered that most of the patients previously had been treated with various medications for many years, it would seem that these patients are well able to determine and to state what the medicine has done for them.

All patients received aureomycin orally in the form of 250 mg. capsules.

CASE REPORTS

The cases are summarized as follows:

CASE 1: Roper Hospital 34,759. A. B., Negro woman, age 37. There was a past history of a fistulotomy performed in December, 1944. On June 1, 1949, she was admitted to the hospital with the following symptoms: intermittent rectal bleeding, mucus discharge from anus, narrowed stools, and peri-anal pain on defecation all of about three years duration. Of interest was

the patient's statement that she had low pain and a dull pain running down the back of the right thigh, and that the back pain and thigh pain were aggravated by defecation. Rectal examination revealed a tubular stricture of firm and irregular consistency, type 3, grade 3, located 3 cm. from anus. The patient was given aureomycin 250 mg. every six hours for 12 days and was discharged. She received a total of 12¼ Gm. Within a month after treatment, she stated that she had had no pain on defecation, a considerable decrease in mucus, and no bleeding from the rectum. The rectal wall, which prior to treatment had an irregular consistency, now had a smooth consistency. She was called in 18 months after aureomycin therapy at which time she had gained 16 pounds. She had no mucus from the rectum and no pain on defecation. She reported a single episode of bleeding from the rectum, not related to defecation, which had occurred two months previously.

CASE 2: Roper Hospital 79,851. A. H. M., Negro woman, age 61, was admitted to Roper Hospital on June 21, 1949, with a history of increasingly smaller size stools (pencil-like), straining at the stool, and progressive constipation of three years duration. Examination of the rectum revealed a firm tubular stricture, type 4, grade 4, 2.5 cm. from anus. Because of the profound degree of stenosis, a colostomy or abdomino-perineal resection was considered. Instead, the patient was given aureomycin 250 mg. every six hours for a total of 12.5 Gm. and was discharged. One month after aureomycin therapy, the patient reported that the stools were of a larger caliber and that she had less straining at the stool. She was lost for further follow-up study.

CASE 3. Roper Hospital 57,553. J. M. B., Negro woman, age 18, was admitted to Roper Hospital on July 22, 1949, with a history of intermittent rectal bleeding beginning about 10 years previously but no bleeding within three years of admission. She complained of increasing constipation, decreased size of stool, pain on defecation and intermittent diarrhea for one year. Examination of the rectum showed a single annular stricture of firm consistency, type 2, grade 2, 6 cm. from the anus. The patient received aureomycin 250 mg. every six hours for a total of 12.5 Gm. and was discharged. One month after treatment, she reported that she had no constipation, no diarrhea, no rectal bleeding, and that her stools were larger in size. She could not be found for further follow-up study.

CASE 4. Roper Hospital 6,054. W. S. L., Negro woman, age 38, was admitted to Roper Hospital on July 16, 1949, with a history of constipation, intermittent rectal bleeding, narrowing of the stools, and pain on defecation of 10 years duration. For 10 years she had been treated regularly at the clinic with rectal dilatations. In the rectum was a single annular stricture of soft and regular consistency, type 2, grade 3, 6 cm. from the anus. She was given aureomycin 250 mg. every six hours for a total of 12.5 Gm. During her hospital stay she had a saphenous vein resection. The patient was asked to come in on December 8, 1950, 17 months after treatment, at which time she showed a weight gain of 19 pounds. She reported that she was much improved and did not need treatment for her rectal condition. She stated that she had no blood or mucus following bowel movements, no pain or straining at the stool. The stricture was still present. The rectal wall was smoothly irregular and there was no blood on the glove after examination.

CASE 5. Roper Hospital 27,528. W. M., Negro woman, age 33. This patient had had a known rectal stricture for four years. She dated the onset

of her rectal symptoms 11 years previously. In October, 1949, her complaints were rectal bleeding, straining at the stool, and progressive narrowing of the stools. One week before entering the surgical clinic, she had abdominal pain and no bowel movements for five days. On examining the rectum, there was an annular stricture of hard, firm, and irregular consistency, type 2, grade 4, 3 cm. from the anus. The patient received aureomycin 250 mg. three times daily for five days, then twice daily for five more days. Three days after starting aureomycin therapy, the patient stated that she had noted that she had easier bowel movements. Since taking aureomycin, she stated that she was "much improved," that she had no pain on defecation, occasional straining at the stool, and only occasional slight bleeding following defecation. The rectal wall presented a smooth lining. One year after aureomycin, this patient continued to remain "much improved."

CASE 6. Roper Hospital 85,111. E. M. H., Negro woman, age 38. This patient had had a rectal stricture for at least nine years. During this time she was seen frequently at the clinic and was treated with regular rectal dilatation, sodium sulfanilate, sulfadiazine, and other medications. In November, 1949, her complaints were pencil-like stools, pain on defecation of five years duration, rectal bleeding with defecation for seven years, and constipation for eight years. She had pain in the right elbow for two months and diminished vision for an indefinite period of time. On rectal examination there were multiple annular strictures, of firm consistency, type 3, grade 3, 5 cm. from the anus. The patient received 250 mg. of aureomycin twice daily for five days, then 250 mg. twice daily for four more days. Since taking aureomycin, she has returned to the clinic bi-monthly. One year after treatment she stated that she had had no pain with defecation, no blood or mucus in the stools, and that the size of the stools has remained "about the same." She also reported a decrease in the use of laxatives, and uses mineral oil only about once every two weeks.

CASE 7. Roper Hospital 84,205. C. E., Negro woman, age 46. This patient had one bout of mild intestinal obstruction one month prior to her admission to Roper Hospital on Nov. 7, 1949. On admission, her complaints were rectal bleeding, gradual decrease in size of stools, some pain on defecation, weight loss of 20 pounds, alternating constipation and diarrhea—all within one year. For 30 years she had had painful and swollen joints of her right hand. The rectum had a hard annular stricture, type 3, grade 3, 6 cm. from the anus. She was given aureomycin 250 mg. thrice daily for six days and 250 mg. twice daily for two days. Following administration of aureomycin, the patient felt greatly improved. There was no rectal bleeding and no mucus discharge following use of the drug. Of interest was the improvement in the arthritis in the right hand, i.e., there was a greater range of motion and a decrease of pain. The stools also were increased in size and there was no straining at the stool. She does not require laxatives. The patient has been followed bi-monthly for a year after aureomycin therapy and has shown no symptoms or signs to suggest a relapse. She has gained the 20 pounds lost prior to treatment.

CASE 8. Roper Hospital 37,954. J. R. R., Negro woman, age 35. On admission to Roper Hospital on Nov. 3, 1949, her complaints were rectal bleeding, mucus from the rectum, pencil-like stools, constipation, straining at the stool of five years duration. Ten years before admission, she had a perirectal abscess. On examination of the rectum, there was a single tubular stricture of hard consistency, type 4, grade 3, 4 cm. from the anus. She received aureo-

mycin 250 mg. thrice daily for five days, then twice daily for five days. After treatment, she had no bleeding from the rectum and a decrease in mucus. She also stated that she had no pain with defecation. The patient was followed at the clinic bi-monthly. One year after aureomycin, she has no bleeding from the rectum and a considerable decrease in the passage of mucus. She has no pain on defecation and no straining at the stools.

CASE 9. Roper Hospital 93,481. R. W., Negro woman, age 39. This patient stated that two weeks before admission to Roper Hospital on July 18, 1950, she started passing a large amount of blood from the rectum. She had alternating constipation and diarrhea for two months and pain on defecation for five weeks. She had an annular stricture of hard, firm and irregular consistency, type 2, grade 3, 3 cm. from the anus. Following a course of aureomycin 250 mg. thrice daily for 13 days, the patient noted a decrease in rectal bleeding and a decrease in straining at the stool. Two months after aureomycin therapy, the patient complained of constipation and blood streaked stools following severe straining at the stool. She was then given aureomycin 250 mg. thrice daily for two days and was lost for further follow-up study.

CASE 10. Roper Hospital 16,610. V. L., Negro woman, age 49. This patient had had a rectal stricture for over 10 years and had been attending the out-patient clinic regularly during this time. She had had fistulae in ano successfully treated by operation in 1943. In July, 1950, she had daily bowel movements and was using mineral oil once or twice a week. There was no straining at the stools and no pain with defecation. She passed no blood or mucus through the rectum in recent years. The rectum had a single tubular stricture of hard and irregular consistency, type 4, grade 3, 2 cm. from the anus. In August, she was given aureomycin 250 mg. thrice daily for five days. When seen in November, the patient stated that she felt improved, that she did not have to take mineral oil as frequently as before, and that she had less straining at the stool.

CASE 11. Roper Hospital 55,653. H. H., Negro woman, age 47. This patient had had rectal manifestations of lymphogranuloma venereum for over 13 years and during this time she had been followed at the clinic. In August, 1950, she was having no pain with defecation, no blood or pus in the stools. The rectum had a single, smooth-lined, tubular stricture of firm and regular consistency, type 4, grade 3, 4 cm. from the anus. In August, 1950, she had a course of aureomycin 250 mg. thrice daily for five days. She has been followed for four months at the clinic. The patient states that she has been benefited by the aureomycin, that she has less pain and straining at the stool than before aureomycin.

CASE 12. Roper Hospital 103,251. L. S., Negro woman, age 52. This patient was seen in the clinic in October, 1950, with the complaints of rectal bleeding following defecation, straining at the stool, alternating constipation and diarrhea. These symptoms developed within the previous year and a half. The rectum had a tubular stricture with an annular component, of firm and irregular consistency, type 4, grade 3, 6 cm. from the anus. She was given aureomycin 250 mg. thrice daily for 10 days. She has noted less straining at the stools and no bleeding from the rectum since taking the drug.

Evaluation of cases

The results show that 6 of the 12 cases treated were benefited for a considerable period of time. Good results were observed in cases 1, 4, 5, 6, 7, and 8. Good results but with limited follow-up were noted in cases 2, 3, and 12. The results in cases 10 and 11 were termed fair. There was little or no change in case 9.

All of the patients reported subjective improvement within a few days after taking aureomycin. They stated that there was less straining, less pain on defecation, and decrease in blood and mucus in the stools. Some thought that the size of the stool had increased.

After treatment, there was usually less tenderness on rectal examination and the rectal wall had a smooth feel. No attempt was made to digitally dilate the stricture. It is assumed that the inflammatory component of the stricture was reduced although the fibrous component persisted. The strictures were not biopsied after aureomycin so that histological confirmation is lacking.

It is interesting to speculate on the fair results obtained in cases 10 and 11. It may be that the patients received an inadequate amount of aureomycin. It is also probably that because these patients having had their strictures for 10 and 13 years, respectively, their strictures were predominantly fibrous and with a relatively smaller inflammatory component.

In retrospect, it would seem that case 9 received an inadequate amount of aureomycin. Should she return to the clinic, she will be advised to take aureomycin for a longer period of time.

What is the correct dosage of aureomycin to be used in the treatment of rectal strictures? The study thus far would indicate that the patients who received aureomycin for 10 days did better than those who received the drug for five days. There may be some patients who will get along satisfactorily on a five day schedule. However, further studies are necessary to determine this.

Most patients reported some side effects from the drug. These included nausea (4), vomiting (2), softer stools (3), more frequent stools (3), pruritus ani (2), and interference with taste.

Further follow-up study is necessary to answer such questions as: Will these patients have to be retreated? Will the stricture progress? Will a colostomy be necessary in the future?

CONCLUSIONS

Aureomycin is by far the most effective drug that has been used thus far at the Medical College Clinic in the treatment of rectal strictures due to lymphogranuloma venereum.

Aureomycin may be tried in nearly all cases of rectal strictures. Should the drug be used, a good proportion of cases may be helped. It should be understood, of course, that aureomycin can not take the place of surgical operations in certain cases.

With further study, it may be possible to predict with greater accuracy which cases of rectal strictures will be benefited with aureomycin and which cases will not.

SUMMARY

Twelve cases of rectal strictures due to lymphogranuloma venereum were treated with aureomycin and were followed.

Six of the 12 cases remained improved from 11 to 18 months.

Good results were obtained in 3 cases, but these were not followed long enough for the results to be conclusive.

The results in 2 cases were classified as fair.

There was little or no change in 1 case.

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INDICATIONS FOR THE VARIOUS METHODS OF PROSTATECTOMY

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THERE are numerous reports in the literature of the virtues of each of the four approaches to the obstructing prostate. Most of these are in support of one particular type of prostatectomy as the ideal operation for all cases of prostatic obstruction. Some compare transurethral prostatectomy with open surgical prostatectomy in general.¹ A few compare two types of open prostatectomy.^{2,3,4} But, to the knowledge of the author, only one paper evaluates on an unbiased basis the four methods of prostatectomy and attempts to postulate the indications for each method in the hands of the genitourinary surgeon who is equipped to perform equally well all of the methods of prostatectomy.⁵

This situation is easily understood when one considers that some training centers perform the majority of prostatic operations by one method. It is inevitable that the resident on these services will be more experienced and therefore more skillful at that type of prostatectomy and will consequently elect to use this procedure largely in his subsequent private practice. Other urologists, who have been equally well trained in all methods, may abandon one or more of the procedures because of some personal idiosyncrasy, because of early misfortunes with a procedure in his private practice, or because of the hospital circumstances under which he works.

Considerable manual dexterity and patience is required in the performance of the transurethral removal of appreciable amounts of prostatic tissue, and many urologists prefer to remove in 30 minutes by open surgery a gland which will require an hour or longer by the transurethral route. Others who champion the latter procedure will utilize it in the removal of large prostates although two operative periods of an hour or more each may be required to remove all of the obstructing tissue.

Perineal prostatectomy was abandoned by many operators in the past because of the occurrence of incontinence, rectourethral fistula, and urethroperineal fistula. These sequellae have been largely corrected in recent years by improvements in operative technic and by the use of the antibiotics. Operative defects in the rectum will now heal per primum in nearly all cases with the use of the intestinal tract drugs sulfathaladine or sulfasuxidine. It is now possible to

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close the prostatic capsule tight after enucleation of the prostatic adenoma whereas formerly a tube had to be left for drainage.

Some urologists have virtually abandoned the retropubic approach because of a high incidence of osteitis pubis^{6,7} in their early cases. Other urologists, however, have not had this complication in large series of cases, and yet others have reported this sequella after transurethral and suprapubic prostatectomy.

Perhaps the greatest factor in the use of the various types of prostatectomy lies in the hospital circumstances under which the operator works. In small hospitals without a resident house staff, the use of the transurethral prostatectomy may be hazardous because of the necessity of close observation for postoperative bleeding and careful attention to the catheter. Likewise, the perineal approach requires three operative assistants and special instruments. On the other hand, the suprapubic and retropubic operations can be easily performed with only one assistant and the necessity for close catheter observation is much less, provided bleeding is well-controlled at the time of operation.

Under optimum conditions the above factors need not concern the operator and the procedure for each patient is selected on the following basis.

TRANSURETHRAL PROSTATIC RESECTION

This procedure is limited in average hands to the removal of roughly 30 Gm. of tissue. With larger glands, more than an hour is generally required for completion of the operation, blood loss becomes appreciable, the risk of hemolysis reaction^{8,9,10,11,12} and resultant stricture formation is increased, and operative morbidity (pyuria, dysuria, frequency) increased. If the obstructing tissue is not entirely removed, the patient and urologist may be faced with the necessity of performing a second resection or an open prostatectomy, either immediately, if the patient is unable to urinate, or at a later date because of persistence of prostatism. Maintenance of sexual potency is one of the points in favor of this procedure; however, in some cases, retrograde ejaculation may occur.

SUPRAPUBIC PROSTATECTOMY

A. One Stage. This procedure is indicated on younger men and older men who are good operative risks who have glands estimated as being larger than 30 Gm. and which are largely intravesical in configuration (fig. 1). Largely intraurethral prostates are difficult to enucleate with this approach, and the internal sphincter and blad-

der neck are necessarily cut or torn with resultant increased hemorrhage. Under any circumstances this procedure is probably the most shocking of the four types of prostatectomy.



Fig. 1. Photograph of specimen weighing 140 Gm. removed by suprapubic prostatectomy demonstrating the huge middle lobe which is larger than the lateral lobes combined.

B. Two Stage. Suprapubic cystostomy drainage is indicated in those cases who do not tolerate urethral catheter drainage and in uremic cases where the NPN comes down so slowly as to require protracted drainage for weeks or months. In such cases, a secondary suprapubic prostatectomy is generally performed, but any of the approaches may be used if indicated.

PERINEAL PROSTATECTOMY

A. Simple Enucleation. This is considered the least shocking of the approaches and is primarily indicated on poor risk patients. It is contraindicated in those cases where sexual life is still important as impotency commonly results. The procedure can be performed on any size or type of prostate, but is more suited for the removal of intraurethral lateral lobe hypertrophies. The often mentioned and much feared complications, incontinence, urethroperineal fistula, and rectourethral fistula have been almost entirely eliminated by improvements in the operative technic and the use of the antibiotics.

B. Radical Prostatectomy. The perineal biopsy is the only method of diagnosing early operable cancer of the prostate. Com-

plete removal of the prostate gland and the seminal vesicles is then carried out by the same approach if the biopsy is positive. This may be done immediately if the frozen section is conclusive. If there is doubt as to the diagnosis on the frozen section, the wound may be closed until permanent sections are run, and then reopened if the sections show cancer. Very little fibrosis is encountered on reopening the perineal wound after three or four days. Radical retropubic prostatectomy may be performed if cancer is found in tissue removed transurethraly; however, these cases are generally no longer operable if the cancer has extended from its usual primary focus in the posterior lobe of the prostate into the periurethral tissues. The exception to this is the so-called case of inclusion carcinoma where the growth arises in the benign adenoma. These cases are never suspected of having cancer of the prostate on rectal examination.

RETROPUBIC PROSTATECTOMY

This approach is indicated for the removal of the hyperplastic prostate which is estimated as weighing over 30 Gm. and as being largely intraurethral in configuration (fig. 2). The blood loss is



Fig. 2. Photograph of specimen weighing 72 Gm. removed by retropubic prostatectomy demonstrating the large lateral lobes and small middle lobes.

considerable in many of the cases and it is probably best to reserve the procedure for patients who are good operative risks. It has the advantage over the perineal approach in that sexual potency is preserved. The postoperative course is strikingly smooth in most of these cases and the patients are more comfortable than those who have had the bladder opened in a suprapubic procedure.

SERIES OF 83 CONSECUTIVE PROSTATECTOMIES

These criteria for selecting the optimum procedure were followed by the author in 83 consecutive cases of prostatism requiring operation.* Table 1 tabulates the number of cases subjected to each approach, the percentage of the total series in each group, the average weight of the tissue removed, and the range of weights in each group. Table 2 shows the number and percentage of the various types of prostatic enlargement found in a series of 800 unselected autopsies reported by Randall.¹³ It is of interest that middle lobe hypertrophy alone occurred in 26.7 per cent of the autopsy series and that 24 per cent of the surgical series were subjected to suprapubic prostatectomy, the main criterion in the selection of these cases being that the hypertrophy be largely intravesical in configuration. Likewise, there was good correlation between the 18.4 per cent lateral lobe hypertrophies in the autopsy series and the 19 per cent subjected to either retropubic or perineal prostatectomy in the surgical cases, the main criterion in selecting these procedures being that the hypertrophy be largely intraurethral in configuration.

TABLE 1

83 Consecutive Prostatectomies

	No. Cases	Per Cent	Av. Weight	Weight Range
Transurethral	47	57	12 Gm.	1 to 40 Gm.
Suprapubic	20	24	83 Gm.	27 to 138 Gm.
Perineal	10	12	58 Gm.	32 to 143 Gm.
Retropubic	6	7	64 Gm.	30 to 72 Gm.

TABLE 2

800 Autopsies; 157 Prostatic Abnormalities

	Number	Per Cent
Lateral Lobe Hypertrophies Alone	29	18.4
Middle Lobe Hypertrophies	42	26.7
Trilobar Hypertrophies	22	14.0
Median Bars	55	35.3
Carcinoma	8	5.0
Sarcoma	1	.6

From Randall, A.: J. Urol., 5: 287, 1921.

Any comparison of the mortality in these four small groups of surgical cases would not be statistically valid. The author wishes to avoid criticism for not considering mortality in this series of cases, and the deaths are recorded for this reason alone. There

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were no deaths following retropubic or suprapubic prostatectomy. There was one death in the perineal group in a man 70 years of age who died 19 days postoperatively of a cerebral vascular accident. There were three deaths in the group subjected to transurethral prostatic resection. The first case, a man of 68 years, died of a cerebral thrombosis 12 days following removal of 20 Gm. of tissue. The second case, a man of 77 years, died of uremia 14 days following removal of 25 Gm. of tissue. Although an autopsy was not obtained, it was the clinical impression that this patient had an hemolysis reaction with resultant nephrosis and oliguria. The third case, a man of 61 years, died of a coronary thrombosis on the fourth day following the removal of only 2 Gm. of tissue. One might assume from these statistics that retropubic and suprapubic prostatectomy are safer procedures, but it should be remembered that, generally speaking, these procedures were selected only for fairly good operative risks.

SUMMARY

The indications for the selection of each of the operative approaches to the prostate, based on the experience of the author and the medical literature, are enumerated and discussed briefly.

A series of 83 consecutive cases in which these criteria were followed are presented.

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EARLY DIAGNOSIS OF CARCINOMA OF THE LUNG*

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CARCINOMA of the lung presents one of the greatest challenges of our day in the early diagnosis and the treatment of malignant tumors.¹ There are two reasons for this. First, oftentimes it defies early diagnosis because there are no characteristic symptoms or signs and therefore it can simulate almost any other pulmonary disease. Second, carcinoma of the lung actually appears to be on the increase. Ochsner² and Graham³ have brought out the fact that there are seen in their hospitals more cases of carcinoma of the lung than those of carcinoma of the stomach. It is interesting to note that the experience in the Roper Hospital is essentially the same. During the nine year period, 1941-1949 inclusive, in the files of the Department of Pathology, there are records of autopsies on more cases of primary carcinoma of the lung than on cases of carcinoma of the stomach.⁴ Certainly it may be said that carcinoma of the lung has become at least equal in frequency to that of carcinoma of the stomach.

Carcinoma of the lung occurs most frequently in the same age group as carcinoma elsewhere—that is in the forties, fifties, and sixties. Fewer cases occur in the younger and older age groups. The occurrence of carcinoma of the lung by sex is disproportionate. Ordinarily the ratio of males to females is considered to be greater than 4 to 1. In our series the proportion has been 4 to 1. Also carcinoma of the lung is more frequent in the white race than in the colored, in a proportion of 4 to 1 in our series.

The etiology of carcinoma of the lung is unknown. The tumor in the lung may begin in a major bronchus or a lesser bronchus and the pathological process varies according to the original site, the rapidity of growth, and the direction of growth. In about one half of the cases the tumor arises in or near a major bronchus and enlarges to such an extent that it produces frequently partial or complete bronchial ulceration and occlusion. There follows then most frequently as a result an area of atelectasis of the lung supplied by the bronchus involved, and secondary to the bronchial obstruction there is frequently secondary infection. The secondary infection may be manifested simply by pneumonitis or there may occur, in addition, bronchiectasis and even single or multiple lung abscesses. More rarely there occurs obstructive emphysema distal to a partial bronchial occlusion. On the other hand, if the tumor arises in a small bronchus in the periphery of the lung and does not involve a

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major bronchus early in the course of its progress, the tumor may attain considerable size before it gives rise to any degree of pulmonary dysfunction, and it may extend directly to the visceral and parietal pleurae with invasion of the thoracic wall or mediastinum.

The symptoms of carcinoma of the lung also vary with the location, the rapidity and direction of growth of the tumor. If the tumor arises in the hilum of the lung and involves early a major bronchus, it will usually give rise to a cough which may be dry at first, but sooner or later it becomes productive and often contains blood, whereas, if the growth arises in the periphery of the lung it will frequently give rise first to pleuritic or constant pain from invasion of the parietal pleura and the intercostal nerves. However, the most common symptoms are cough, hemoptysis, fatigue, shortness of breath, a sensation of inability to get a deep breath, wheezing in the chest, pain in the chest, and fever.

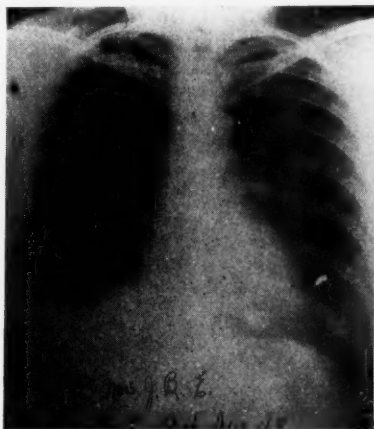


Fig. 1 (Case 1). Normal x-ray of the chest in the presence of carcinoma of the lung proven by bronchoscopy about three weeks later.

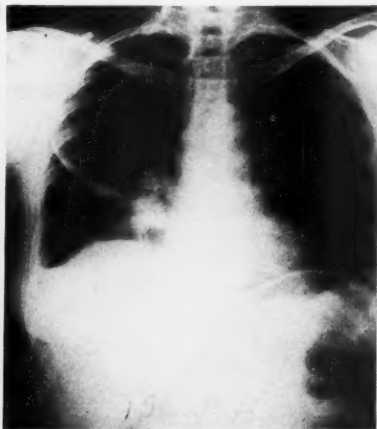


Fig. 2 (Case 1). Inoperable carcinoma of lung and pleura on right.

The presence of any one of these symptoms should arouse one's suspicion of the possibility of the presence of carcinoma. This applies particularly when a symptom such as an unexplained cough persists for six weeks or longer in a person who has reached the cancer age, even though an x-ray of the chest may be normal. An x-ray may not show a small tumor of a bronchus which has not yet caused atelectasis or obstructive emphysema. In such a case, all additional methods of study should be utilized, especially bronchoscopy and cytological examination of the sputum. An example of such a case follows:

CASE 1. (Roper Hospital #71881.) F. E., white female, 59 years of age, was admitted in September, 1948. She had had a cough for years, but in June, 1948, it became "chronic" and associated with chest pain, dyspnea, fever, and weight loss. She consulted her physician who found physical and x-ray examination of the chest normal (fig. 1). On her admission just a few weeks later, she was found to have a massive pleural effusion, after removal of which an x-ray of the chest (fig. 2) showed atelectasis of the right middle and lower lobes and two large round shadows in the right hilum. At this time bronchoscopic examination revealed obvious carcinoma on the right, proven by biopsy. The tumor was inoperable because of the effusion which also contained malignant cells. It is exceedingly likely that bronchoscopy would have revealed the same finding at any time after June, 1948.

It is apparent that there is nothing characteristic about the symptoms of carcinoma of the lung, which are common to nearly all acute and chronic diseases of the lung. Therefore it is not surprising that in the past the diagnosis has not been made until late in a great many cases. Actually the stage of the disease at the time the diagnosis was first established in our series was early in only a very small percentage.

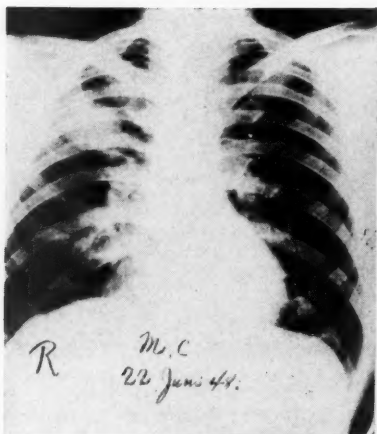


Fig. 3 (Case 2). Carcinoma of the right lung present in the absence of symptoms. See text.

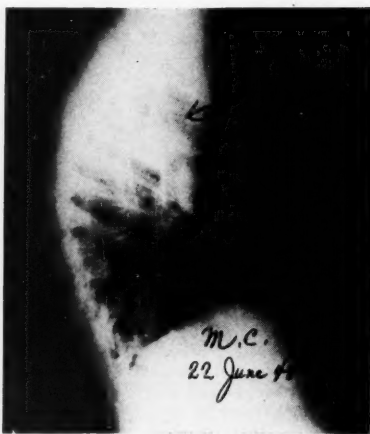


Fig. 4 (Case 2). Lateral view of Fig. 3.

Indeed carcinoma of the lung may exist and be entirely symptomless. In these days of surveys of large groups of the population by chest x-ray, occasionally a shadow of a mass is found in the lung, which mass may be found to be carcinoma.⁵ At other times the patient may have had "pneumonia" with complete recovery subjectively, yet the x-ray may show a persistent abnormal shadow. An example of the latter type follows:

CASE 2. (Roper Hospital #66919.) M. C., white male, 46 years of age, was admitted in June, 1948. During the winter of 1948, he had a nonproductive cough and vague pains in the right chest. In March, 1948, he had "flu" with high fever but recovered completely, although the cough persisted. However, since a shadow in the right upper lobe did not disappear, his physician referred him for further study and treatment. On admission, the patient had no complaints. Further, he stated that he never felt better in his life, and wished that people would stop worrying him about his chest. X-rays of the chest (figs. 3 and 4) revealed a rounded shadow in the right upper lobe. All other diagnostic studies were normal. Since carcinoma could not be excluded, exploratory thoracotomy was performed. Adenocarcinoma of the right upper lobe was found and was treated by lobectomy. He has remained well without evidence of recurrence since.

In addition to the lack of characteristic symptoms there are other reasons why the diagnosis has not been made early. Essentially these are the same reasons encountered in cases of other internal carcinomata. The patient may fail to report to a doctor because he does not consider any symptoms to be significant. However, an additional important reason is that though many patients report to a doctor early in the course of the disease, the possibility of cancer is not suspected. Some of the erroneous diagnoses encountered in our series of cases have been tuberculosis of course, also syphilis, typhoid fever, pneumonia, pleurisy, asthma, bronchiectasis, and such nonpulmonary diseases as myasthenia gravis, aneurysm of the aorta, and neurofibroma. Actually in the case of the nontuberculous pulmonary diagnoses, the disease did exist but the fact that the primary etiological factor was carcinoma was overlooked.

The methods of diagnosis of carcinoma of the lung in addition to the history and physical examination are many and include the following:

1. Fluoroscopy of the chest.
2. X-rays of the chest in two or more planes.
3. Bronchoscopy.
4. Examination of the sputum for tumor cells.
5. Examination of bronchial aspirations for tumor cells.
6. Bronchography.
7. Biopsy of lymph nodes to which it has spread.
8. Examination of pleural fluid for tumor cells.
9. Biopsy of the pleura without exploratory thoracotomy.
10. Biopsy of the lung.
11. Exploratory thoracotomy.
12. Autopsy.

It should be stated that x-ray examination of the chest in known or suspected pulmonary disease should always include more than a single P-A view. At times lesions are apparent on lateral or oblique

views when not so on the routine P-A film. Even if a lesion is apparent on the P-A film, the availability of additional views gives one further important information, especially concerning the extent and precise location.

As stated before, an x-ray of the chest may not show a carcinoma unless it has obstructed a sufficiently large bronchus in order to produce significant atelectasis, secondary infection with or without abscess, obstructive emphysema, or a combination of these. It is certain that oftentimes one sees on the x-ray film only the effects of the tumor rather than the tumor itself. An example of such a case follows:

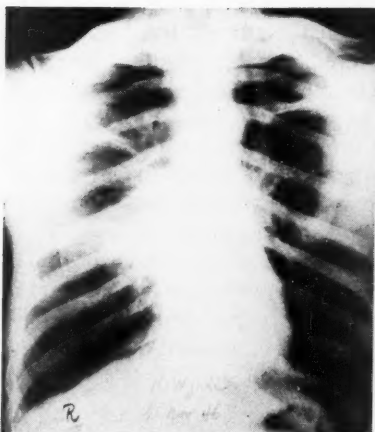


Fig. 5 (Case 3). Atelectasis and obstructive emphysema in the lower half of the right lung field due to carcinoma proven by bronchoscopy and biopsy.

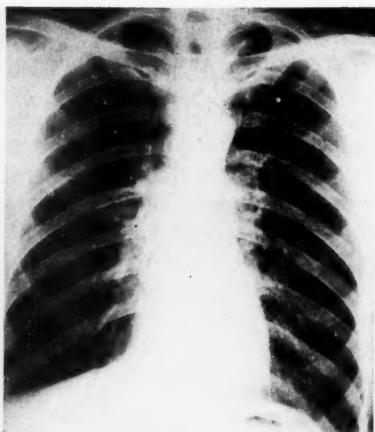


Fig. 6 (Case 3). Normal x-ray of the chest in the presence of proven carcinoma. See text.

CASE 3. (Roper Hospital #52,645.) C. W., white male, 52 years of age, was admitted in November, 1946. He had a cough with hemoptysis, and localized wheezing in the right chest for several months. X-rays of the chest (fig. 5) showed an area of atelectasis in the right hilar region with obstructive emphysema below it. Bronchoscopy was performed and a large tumor was found and removed from the right lower lobe bronchus. The tumor mass was 11mm. in its greatest diameter, and its removal relieved the bronchial obstruction completely. Microscopic sections of the tumor showed carcinoma. Right pneumonectomy was advised, but relief of the bronchial obstruction relieved all his symptoms, and he refused operation. Not until March, 1947, did he decide to have operation elsewhere. At that time, five months after establishing the diagnosis, he had no symptoms and the preoperative x-ray (March, 1947) (fig. 6) was entirely normal. The known residual carcinoma in the wall of the bronchus was not apparent in the x-ray and there were no abnormal roentgenographic signs because the tumor had not increased in size sufficiently

in the interim to produce atelectasis or emphysema secondary to bronchial obstruction. He was treated successfully by middle and lower lobectomy.⁶

Bronchoscopy will afford proof of the diagnosis of carcinoma coincident with microscopic examination of a biopsy of a suspicious lesion only in those cases in which the lesion involves a bronchus sufficiently large to be accessible to the bronchoscope. Actually this is the situation in only 40 per cent to 60 per cent of the cases.⁷ In the remainder cytological examination of the sputum or bronchial aspirations for the presence of malignant cells is becoming increasingly important. The use of this latter method will allow one to establish a definite diagnosis in many additional cases prior to operation.⁸

At times bronchoscopy is valuable also in providing what might be called indirect evidence of carcinoma. Such evidence consists of the finding of narrowing of a bronchus as by compression from without. An example of such a case follows:

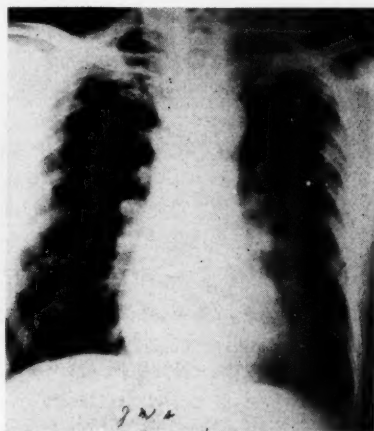


Fig. 7 (Case 4). Normal x-ray of the chest occurring in a patient with symptoms of bronchial obstruction on the left and with only indirect evidence of carcinoma in the left main bronchus on bronchoscopy.

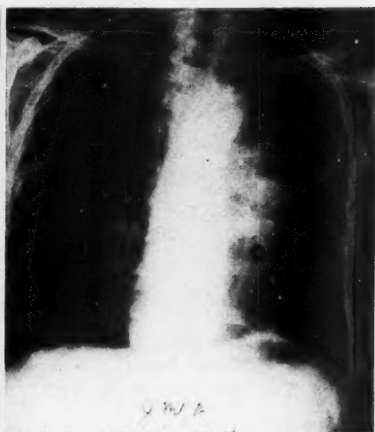


Fig. 8 (Case 4). Inoperable carcinoma of the lung. See text.

CASE 4. (St. Francis Infirmary #30,599.) J. M. A., white male, 70 years of age, was first seen in September, 1946. He had had a cough and chest pain for several months. He was seen by another doctor for the same complaints in June, 1946. An x-ray of the chest was normal (fig. 7), but bronchoscopy revealed evidence of pressure from without on the left main bronchus. When seen in September, the left vocal cord was paralyzed and the tumor was inoperable. An x-ray of the chest (fig. 8) showed a large rounded shadow in the left hilar region consistent with the diagnosis of carcinoma. Bronchoscopy was repeated with the same observation. The presumptive evidence in June,

1946, even though the chest x-ray was normal, was sufficient to justify and indicate exploratory thoracotomy on the left because of the possibility of the presence of carcinoma.

Bronchography is of very little value in the diagnosis of carcinoma, as it can demonstrate only an anatomical defect in the bronchi and not the etiological factor. If filling defects of the bronchi are found, as in bronchiectasis, they may be secondary to an obstructive lesion of a bronchus, and carcinoma would still have to be included in the differential diagnosis. An example of the presence of bronchiectasis causing one to overlook carcinoma as the primary factor, follows:

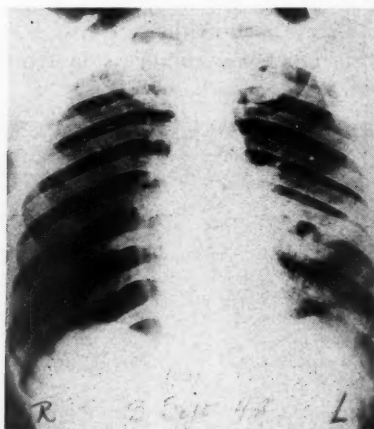


Fig. 9 (Case 5). Pulmonary disease on left of unknown etiology associated with mild bronchiectasis on bronchography.

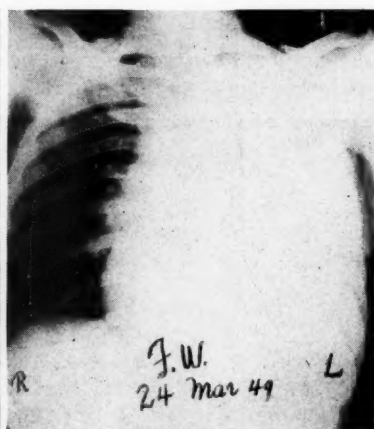


Fig. 10 (Case 5). Inoperable carcinoma of the left lung and pleura. See text.

CASE 5. (Roper Hospital #71,555.) F. W., colored male, 48 years of age, was admitted in September, 1948. He complained of fever and a cough productive of yellowish-brown sputum, of four weeks duration. No hemoptysis. Loss of 24 pounds in weight. There were physical signs of left pulmonary disease, and x-rays of the chest (fig. 9) revealed a density in the left hilum and lower lung field with a large cavity beneath the ninth rib posteriorly. All studies to prove the presence of carcinoma or other specific etiology were non-contributory. Bronchograms were made and showed moderate bronchiectasis in the affected portion of the left lung. The possibility of carcinoma being the etiological factor was not considered strongly enough. He improved markedly while in the hospital, and was discharged with instruction to return in a few weeks for further study. When next seen in March, 1949, he was found to have inoperable carcinoma (fig. 10), proven by the presence of malignant cells in a massive pleural effusion. Obviously, when first seen, in the presence of pulmonary disease of unknown etiology and possibly carcinoma, he should have had an exploratory thoracotomy for diagnosis and treatment.

Biopsy of the lung by needle puncture is not recommended except in far advanced obviously inoperable cases in whom it has not been possible to establish the diagnosis by other methods.

Some of the methods of diagnosis enumerated above are those designed to confirm the clinical diagnosis of far advanced disease. The early diagnosis is difficult and all indicated preoperative examinations may be negative. Therefore, the method of diagnosis which is becoming increasingly important from the standpoint of early discovery, and therefore curability, is that of exploratory operation.^{5,9} If a patient is in the carcinoma age group and has pulmonary disease and no other disease can be proven to account for it, then carcinoma must be suspected strongly even though all the preliminary examinations are negative. Exploratory operation must be advised as it may be the only method of establishing the diagnosis before the disease is too extensive for possible cure. Opening the chest in the present era is no more dangerous than opening the abdomen.

The only possible successful treatment for carcinoma of the lung, in view of the present state of our knowledge, is its complete removal from the body along with all possible regional sites of spread. Thus, in carcinoma of the lung it is believed best to remove the entire lung along with the hilar and mediastinal lymph nodes and occasionally part of the thoracic wall or diaphragm, whenever possible. At times it is wise to remove only the lobe of the lung which is involved because of impaired cardio-respiratory reserve of the patient as determined by preoperative study.

In most patients, unfortunately, the disease when first diagnosed is so advanced that it is useless to consider operation as a possible method of cure. In others, operation is advised but unfortunately in most of these it is found at operation that the lesion is non-resectable. In a few it is best to remove the lung, even though the growth has extended beyond the bounds of possible curability, in order to prolong life, and more important to make more comfortable the patient's remaining life. Palliative resection of carcinoma of the lung when feasible is just as important as in other carcinomata, such as the breast or colon.⁹ In the remaining, approximately 25 per cent of all cases, the lung can be resected with the actual chance and hope of cure.

In large series of cases reported from other clinics, the end results are poor.⁹ There are only 8 per cent of all cases alive and well at the end of five years. However, it is encouraging that the five year survival rate increases to 25 per cent if only those cases in which the primary tumor can be resected are considered.⁷ Obviously the

answer to better results in the future is early diagnosis and treatment.

A study of our series of 66 cases of carcinoma of the lung seen from January, 1946, through December, 1949, has borne results consistent with the above observations. The diagnosis was confirmed by microscopic examination of the primary tumor or metastases in 50 cases. In the remaining 16 cases, the clinical characteristics and the course of the disease were such as to make the diagnosis almost unequivocal. There were 53 males and 13 females, a ratio of approximately 4 to 1. Likewise, there were 53 cases in the white race and 13 cases in the colored.

In 39 (59 per cent) of the 66 cases, the extent of the tumor and its metastases was such that exploratory operation to determine resectability was not indicated. In the remaining 27 cases (41 per cent), exploratory operation was advised. Four refused operation and three went elsewhere. In another case, operation was advised but the advice was not concurred in by the referring physician. In the remaining 19 cases (29 per cent), thoracotomy was performed and 11 were found to be non-resectable. The remaining 8 cases (12 per cent) were treated by resection. In 5 of the 8 cases, the resection was obviously palliative, and 4 of the 5 have since died of persistent extra-pulmonary disease. The fifth case is expected to succumb at an indefinite time in the future. In the other 3 cases, the resection was possibly curative. Of these, 2 are alive and well, the longest for four years since the operation. The other remained free of evidence of carcinoma, but died of other disease two years following operation.

DISCUSSION

It cannot be emphasized too strongly that exploratory operation must come into increasing use as a method of diagnosis in those cases of pulmonary disease in whom the presence of carcinoma cannot be reasonably excluded, and in whom no other disease can be proven to account for the clinical picture.¹⁰ In the support of the above, it may be stated that during the same period of time, there were 18 exploratory operations performed in cases suspected of having carcinoma but in whom all other diagnostic methods had been exhausted in the attempt to establish a diagnosis preoperatively. Of the 18 cases, 9 (50 per cent) were found to have carcinoma. In the remaining 9 cases, there were found aortic aneurysm in 3 cases, tuberculosis of the pleura and lung in 2 cases, and organizing pneumonia, lung abscess, actinomycosis, and intrathoracic goitre in 1 case each. In the cases of lung abscess, actinomycosis and goitre, excision of the lesion was the preferable treatment, so that the num-

ber of cases in which operation was proven to be justified was raised to 12 (66 per cent), even though all the cases of carcinoma were not resectable. It must be remembered that at times prognosis is just as important as diagnosis. Further, with increasing use of aortography in the diagnosis of aneurysm, it is believed that in the future it is probable that the percentage of cases in which carcinoma of the lung is found at such exploratory operations will become even higher.

SUMMARY

1. The bases for suspicion of the presence of carcinoma of the lung, and the methods of establishing the diagnosis early in the course of the disease are discussed.
2. Pertinent case reports are presented to stress the principles involved.
3. The importance of the use of exploratory thoracotomy as a method of diagnosis is stressed.

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THE MEDICAL COLLEGE OF THE STATE OF SOUTH CAROLINA NUMBER

The Medical College of the State of South Carolina was founded under the name of the Medical College of South Carolina in 1823 and has been in continuous operation, except for the time when Charleston was directly involved in the actions of the War Between the States.

At first under ownership and control by the Medical Society of South Carolina, it was transferred to the State of South Carolina in 1913. Since that time it has been operated as a member of the State University System, although under a separate Board of Trustees and with its own fiscal arrangements.

For most of the life of the College it has been intimately connected in clinical teaching and service with the Roper Hospital, which is itself of unique relations, it being owned and operated under various trusts by the Medical Society of South Carolina. The faculty of the Medical College constitutes the staff of Roper Hospital.

In order to expand its facilities and its services to the medical

profession and the people of South Carolina, the Medical College is now involved in a large expansion and construction program.

Toward this purpose there is being provided a large campus area on the Ashley River side in the heart of the City of Charleston in which the various institutes of and related to the Medical College will be gathered into a medical community. The School of Medicine buildings will be enlarged to provide teaching, research and clinic expansion. A new Medical College Hospital will be constructed immediately adjacent to and physically joined with the School of Medicine. The School of Pharmacy will have new quarters, as will the School of Nursing, which is jointly operated with the Roper Hospital. Dormitories for students and housing for staff, together with recreational facilities will be provided.

A new tuberculosis hospital, the Pinehaven Sanatorium of Charleston County, will be a related unit. In cooperation with the County Health Department a new health center with public health school opportunity will be another unit.

The main building of a new Roper Hospital has already been constructed and is in operation. The hospital program calls for the entire replacement of the old buildings by new structure.

Immediately adjoining is the St. Francis Xavier Infirmary, the main part of which is new and which has just opened a new School of Nursing building.

The staff of the School of Medicine of the Medical College of the State of South Carolina has always played its part in the improvement of health and the advancement of medicine in the south and in the nation. We are complimented to have the opportunity of sponsoring a special number of the AMERICAN SURGEON.

KENNETH M. LYNCH, M.D.,
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PROTECTION OF RECURRENT LARYNGEAL NERVES AT THYROIDECTOMY

Injury to the recurrent laryngeal nerve is so commonly followed by such serious and distressing complications that the importance of preventing it cannot be overemphasized. While there is no one method of accomplishing this, the adherence to certain principles will reduce its incidence to a minimum.

The single greatest advance in the protection of the recurrent laryngeal nerve at thyroid operations is the demonstration by Dr. Lahey that it can be exposed without causing injury to it. As a result of this, it is more or less routinely identified by a great many surgeons who do thyroid operations; however, exposing the nerve is not devoid of risk. It requires familiarity with the anatomy of the region and careful dissection in a bloodless field. The most common causes of injury to the nerve are crushing with forceps, severing it because it is unrecognized, and traction upon it. Mobilizing the gland may result in traction upon the nerve at the lower pole, or at the point of its entrance into the larynx; at the latter location avulsion is particularly likely due to the attachment of the nerve to the capsule of the gland. The fact that the course of the nerve is subject to variation, both developmental and secondary to the type of enlargement of the thyroid gland, adds to the technical difficulty and correspondingly to the accompanying danger. Before attempting to expose the nerve the lobe should be partially mobilized by dividing the isthmus and severing the anterolateral attachments to the larynx. The superior thyroid artery and the lateral vein should be severed and ligated. The inferior veins should be treated likewise, but only with utmost care due to the proximity of the nerve. Ligation of the inferior thyroid artery is of great assistance in preserving a bloodless field, and can be done safely at some distance from the gland. On the other hand, it greatly reduces the blood supply of the remaining thyroid gland, and in particular of the parathyroid bodies. Though adding to the difficulty of isolating the recurrent nerve, it would appear advisable to leave intact one inferior thyroid artery and preferably both. Parathyroid deficiency is of greater incidence than commonly recognized, and every precaution should be taken to prevent it.

Exposing the nerve does not always offer it the greatest protection. Under conditions of certain technical difficulties, particularly uncontrolled bleeding, and inexperience on the part of the operator, it is often advisable not to attempt it. Also in many cases the operation proceeds in such a manner that the resection of a lobe can be

safely completed without identifying the nerve, in which case to expose it would subject it to trauma unnecessarily.

In case of evidence of injury to a nerve, either before operation or occurring during operation, conditions permitting, it is imperative that it be dissected out throughout its course so as to take, at the time, all possible restorative and reparative measures. The findings would necessarily influence subsequent procedures, such as extra precaution against nerve injury on the other side, and the advisability of a tracheotomy in case of bilateral injury.

Anesthesia is beyond the scope of this paper, except in so far as it has a bearing upon injury to the recurrent nerves. Under general anesthesia voice and breathing changes due to recurrent nerve injuries are usually not recognized during operation. Under intratracheal anesthesia they cannot be recognized until the removal of the intratracheal tube. This means delay in ascertaining the nature of the nerve injury and instituting any indicated corrective measures. Under general anesthesia there is the tendency for the surgeon to cause unnecessary trauma by applying more traction on the gland than is advisable.

Local anesthesia, accompanied by well controlled analgesia with inhalation or intravenous agents, has the advantage of making possible immediate recognition of voice and respiratory changes, the persistence of which, after release of any traction upon the gland, indicates a more serious nerve injury and makes possible at the time a thorough examination of the nerve and the institution of restorative measures. Under local anesthesia operating is more time-consuming and exposure is more difficult; however, the technic must of necessity be gentle, with resultant minimal trauma.

Generally speaking the presence after operation of a clear voice and a strong cough indicates that both recurrent nerves are functioning normally and will continue to do so. However, in some few instances patients subsequently complain of voice fatigue which interferes with public speaking, and inability to hold a note while singing. In these cases, on mirror examination the vocal cords show a normal range of motion. It is my impression that these disturbances have occurred more often since I have been more or less routinely isolating the recurrent nerve. It is only reasonable to expect such a delicate structure to suffer some trauma in an operation approaching it so closely. Such would all the more likely result from the dissection necessary to expose it. Theoretically these nerves would be best protected by leaving them in their bed undisturbed. In practice, the danger of subjecting them to slight trauma by exposure is more than offset by the protection afforded them against more serious injury.

Regardless of whether or not the recurrent nerve is exposed, it is afforded greatest protection by a very careful technic. All vessels should be clamped individually and under visual control. Undue traction, mass ligatures, transfixion sutures, and placing pilot hemostats without first locating the nerve, are accompanied by danger of injury to it.

The surgeon who does thyroidectomies regularly should plan the operation so that the nerve can be exposed before the final stage of resection of a lobe. On the other hand he should make no attempt to expose it if the operation proceeds in such a manner that exposure is not necessary for its protection such as in conservative resection for thyroiditis and intracapsular enucleation of nodules, or in the presence of technical difficulties where there is undue danger of injuring the nerve by attempting to expose it. The surgeon who does only an occasional thyroidectomy should make a careful but only limited attempt to isolate the nerve. If he does not readily find it, he should make no further attempt, but for its protection should rely upon careful dissection under visual control, avoidance of undue traction, and leaving the postero-medial portion of the lobe. A total, or radical subtotal, removal of a lobe requires identification and dissection of the nerve and should not be attempted by those unfamiliar with the field.

WILLIAM H. PRIOLEAU, M.D.

THE AMERICAN SURGEON

The first issue of THE AMERICAN SURGEON (formerly *The Southern Surgeon*) was published January, 1951.

EARLY HISTORY

The Southern Surgeon, the official publication of The Southeastern Surgical Congress, was founded in 1932 and published quarterly through 1934. Beginning the year 1935 it was published bimonthly through 1939. January, 1940, it became a monthly publication and has been published monthly except during the years of 1943-1945, and the first six months of 1946. During these war years the publication was suspended in cooperation with the war effort. During the years 1932 through 1942 it was published under the editorship of Dr. L. Minor Blackford, who began and kept it on a very high level, with the highest rating of editorship.

Resuming publication in 1946, it has been published monthly. In the meantime its scope has been enlarged and its circulation extended to the four corners of the globe. Dr. Irvin Abell, Jr., was appointed editor in January, 1948.

In 1947 an experiment was inaugurated which broadened its usefulness. Two issues yearly, February and August, were allocated to the Medical Colleges. The first Medical College to participate was the University of Alabama. The surgical staff of the university furnished all of the papers for the February issue which was dedicated to the University of Alabama surgical staff. The University of Tennessee, surgical department, was awarded the next issue which was August, 1947. The staff of this university furnished so many good papers it was necessary to devote the August and September issues to their papers.

Emory University edited the February, 1948, issue and the Tulane University the August issue.

The University of Virginia and the University of Oklahoma edited the February and August issues, 1949, and the University of Louisville and the Medical College of Virginia edited the February and August numbers in 1950. It is thus seen that nine medical colleges, including this number, have participated in editing *The Southern Surgeon* since February of 1947.

THE TEXAS SURGICAL SOCIETY

During the years 1940 through 1942 *The Southern Surgeon* published the papers presented at the annual assemblies of the Texas Surgical Society. The relationship between *The Southern Surgeon*

and the Texas Surgical Society was very cordial and no doubt this relationship would have continued had it not been for the suspension of publication of the journal during the war years. The Texas Surgical Society continued their annual meetings and needed their papers published, consequently had to seek another source for publishing them.

THE SOUTHWESTERN SURGICAL CONGRESS

The Southwestern Surgical Congress was organized October 3, 1948, and *The Southern Surgeon* was adopted as the official publication of this organization.

JOINT OWNERSHIP AND CHANGE OF NAME

During the year 1950 The Southwestern Surgical Congress became joint owner of *The Southern Surgeon*, and at a meeting of a joint committee representing the two organizations held at Dallas, Texas, December 17, 1950, it was decided that the name of *The Southern Surgeon* should be changed. It was unanimously agreed by the committee that the journal had outgrown its local bounds and that it should be published on a national level, and the name was changed to THE AMERICAN SURGEON.

THE JOINT COMMITTEE

The personnel of the joint committee was composed of four representatives from the Southwestern Surgical Congress: Dr. L. J. Starry, President of the Southwestern Surgical Congress, Dr. Thomas J. Orr, past President, Dr. G. W. N. Eggers, councilman of the Congress from Texas and Dr. C. R. Rountree, Secretary-Treasurer. The four from The Southeastern Surgical Congress were: Dr. C. C. Howard, President of the Southeastern Surgical Congress, Dr. Gilbert Douglas and Dr. R. L. Sanders, past Presidents of the Congress, and Dr. B. T. Beasley, Secretary-Treasurer.

The committee made other recommendations for reorganizing the editorial personnel of the journal. Dr. Thomas G. Orr, of Kansas City, Kansas, was recommended for editor, and the present managing editor was retained. The editorial board is to consist of twenty-four surgeons; twelve to be chosen by The Southwestern Surgical Congress and twelve by The Southeastern Surgical Congress. The committee recommended that one associate editor from each organization be appointed. Dr. C. R. Rountree was retained by the western group and Dr. J. Duffy Hancock was selected by the eastern group. The present abstract editor, Dr. R. H. Stephenson, and the present book review editor, Dr. A. H. Letton, were retained.

This committee made further recommendations with reference

to the cover pages and format of the journal. The first issue conforms to the recommendations as to colors, form and size.

IN RETROSPECT

It is interesting to examine the contents of the first issue of *The Southern Surgeon*.

The first scientific paper published was by Dr. Charles E. Dowman, on The Diagnosis and Management of Brain Injuries. It was Dr. Dowman who was largely responsible for the introduction of neurosurgery in the south. The second scientific paper was by that master surgeon, Dr. John B. Deaver, on The Dramatic Abdomen. Dr. Hugh Young presented the third paper on The Differential Diagnosis and Management of the Senile Prostate.

Many others of the nation's master surgeons contributed to the first issue. Many are yet living and going strong, others have passed on to their reward. Such names, living or dead, as Lahey, Erdmann, Royster, Babcock, Sanders, Ballenger, Abell, Horsley, Boland, Waltman Waters, George W. Crile, Sr., Vilray P. Blair, Chevalier Jackson, Rankin, Hedblom and many others were valuable contributors in the early history of *The Southern Surgeon*.

A DREAM REALIZED

Many of the founders of *The Southern Surgeon* dreamed of the day when a national surgical journal could be published in the south. It was felt that the surgeons of the south needed such a journal in which they could publish their work and particularly the younger surgeons who needed such encouragement to write.

For several years the life of *The Southern Surgeon* was suspended on a very small thread, and had it not been for the courage and perseverance and personal sacrifices made it would have gone the way many other noble undertakings have gone for lack of support.

This brief review of the history of *The Southern Surgeon*, now THE AMERICAN SURGEON, cannot be closed without paying tribute to a man who made a most valuable contribution to the journal. The late Walter Goodloe Stuck of San Antonio, Texas, the first president and co-founder of The Southwestern Surgical Congress. It was largely through his efforts that the Texas Surgical Society became an ally of *The Southern Surgeon*, and that the Southwestern Surgical Congress, a companion association to The Southeastern Surgical Congress, was organized and became co-owner and an ally of the first magnitude in the history of THE AMERICAN SURGEON.

B. T. BEASLEY, M.D.
Managing Editor.

